United States
Department of
Agriculture

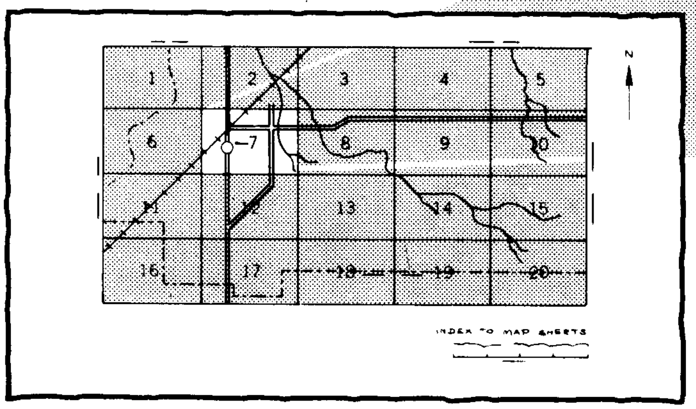
Soil
Conservation
Service

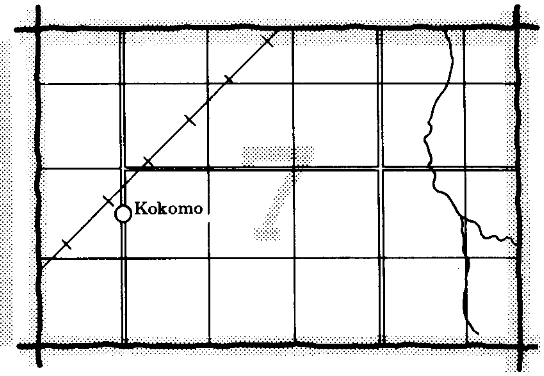
In cooperation with
North Carolina Department
of Natural Resources and
Community Development,
North Carolina Agricultural
Research Service,
North Carolina Agricultural
Extension Service,
Chowan County
Board of Commissioners, and
Perquimans County
Board of Commissioners

Soil Survey of Chowan and Perquimans Counties, North Carolina

HOW TO USE

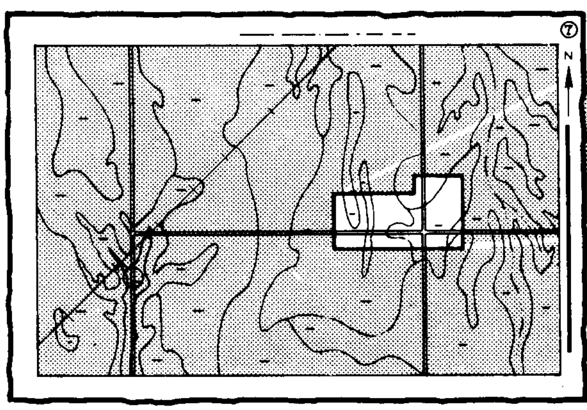
1. Locate your area of interest on the "Index to Map Sheets".

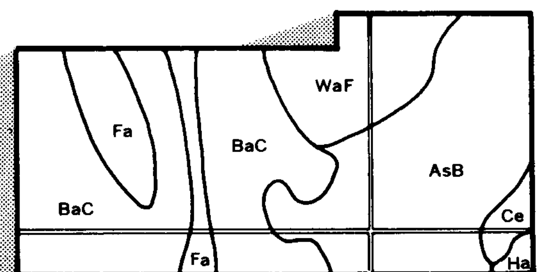




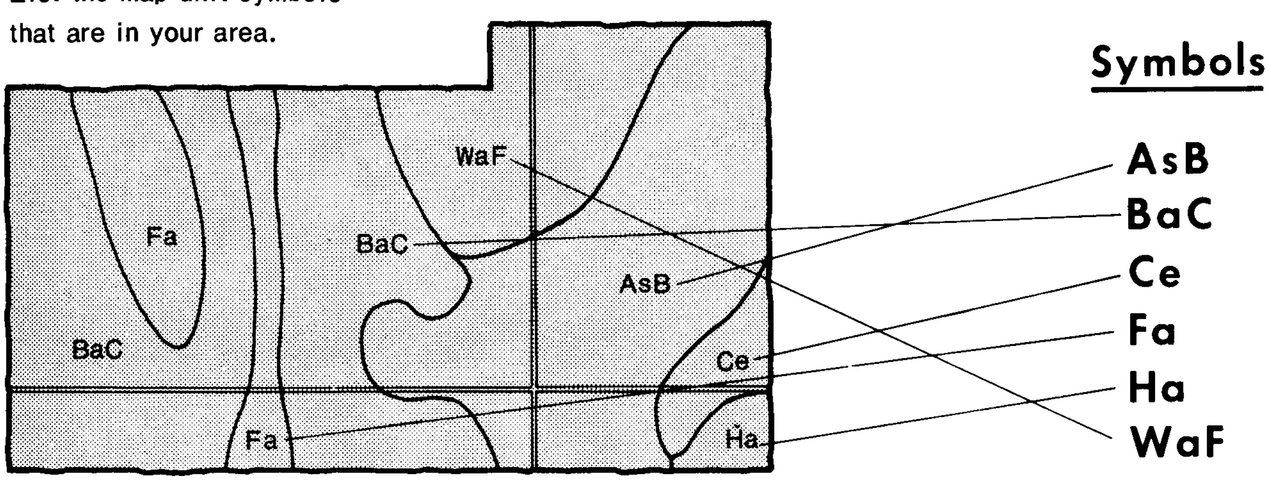
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



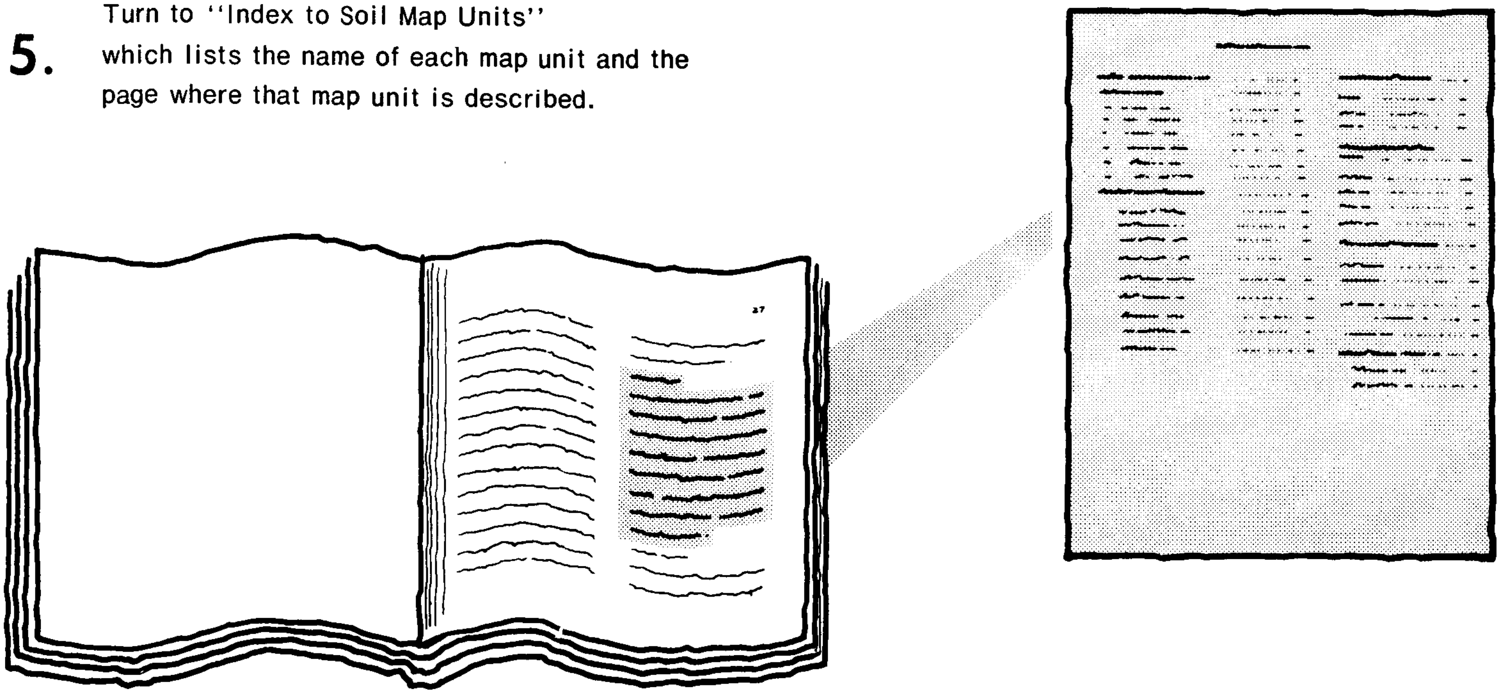


4. List the map unit symbols that are in your area.

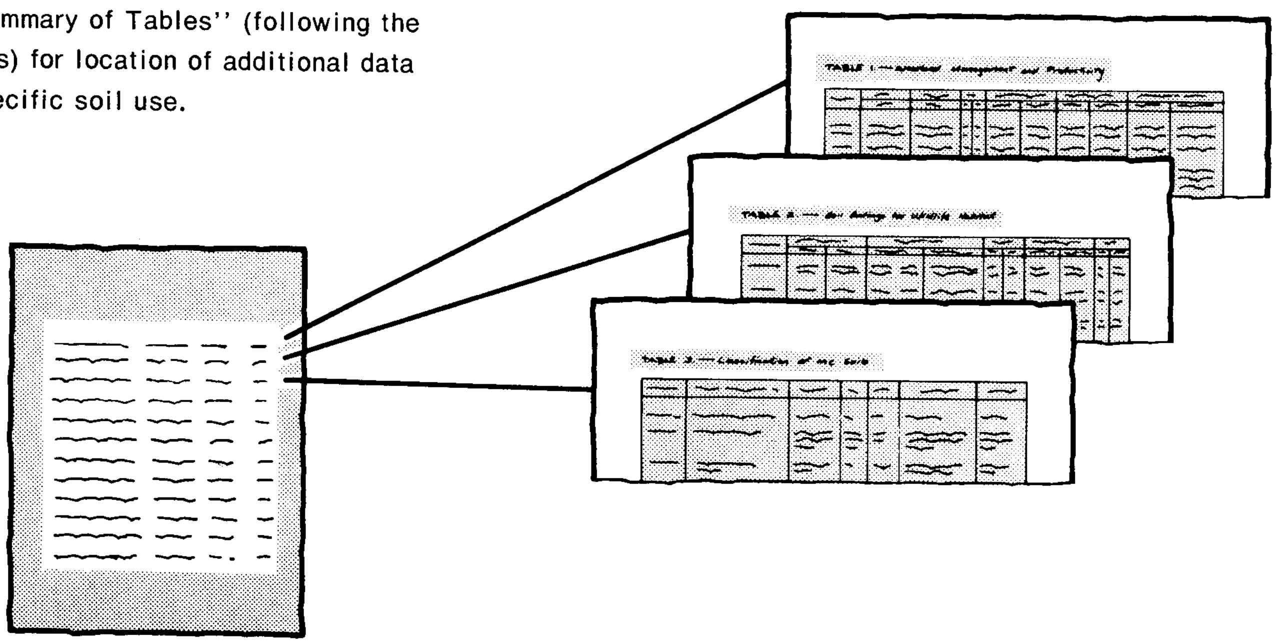


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This soil survey was made cooperatively by the Soil Conservation Service and the North Carolina Department of Natural Resources and Community Development, North Carolina Agricultural Research Service, North Carolina Agricultural Extension Service, Chowan County Board of Commissioners, and Perquimans County Board of Commissioners. It is part of the technical assistance furnished to the Chowan and Perquimans Counties Soil and Water Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Chowan County was published in 1906, and the first soil survey of Perquimans County was published in 1905. This survey combines the two survey areas, updates the first soil surveys, and provides additional information.

Cover: Munden loamy fine sand, 0 to 2 percent slopes, is an excellent soil for peanuts.

Contents

Soil Series

Issued September 1986

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Chowan and Perquimans Counties. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

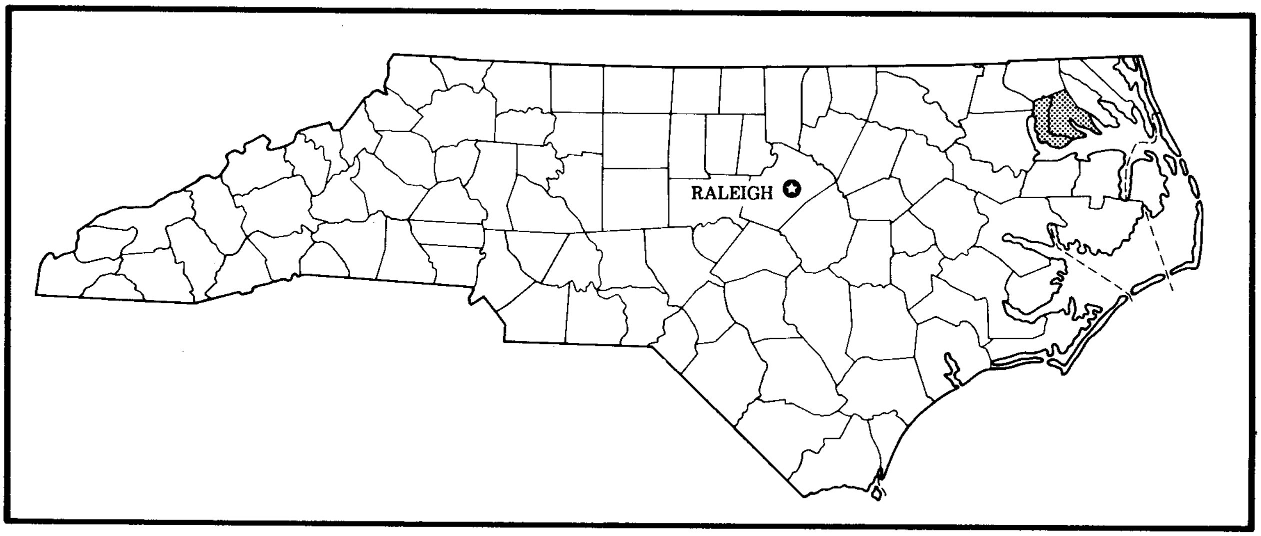
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

Coy A. Garrett

Coy A. Garrett
State Conservationist
Soil Conservation Service



Location of Chowan and Perquimans Counties in North Carolina.

Soil Survey of Chowan and Perquimans Counties, North Carolina

By Phillip L. Tant, Soil Conservation Service

Soils surveyed by Phillip L. Tant, Joe P. Covington, and
Robert H. Ranson, Jr., Soil Conservation Service,
and J. Roger Hansard, John M. Scott, and L. Allan Mize,
North Carolina Department of Natural Resources and Community Development

United States Department of Agriculture, Soil Conservation Service
in cooperation with North Carolina
Department of Natural Resources and Community Development,
North Carolina Agricultural Research Service,
North Carolina Agricultural Extention Service, and the
Chowan and Perquimans Counties Boards of Commissioners

Chowan and Perquimans Counties are in the Coastal Plain in the northeastern part of North Carolina. The 1971 U. S. Census reported a population of 10,764 for Chowan County and 8,351 for Perquimans County. Approximately 45 percent of the population of Chowan County is considered rural, and all of Perquimans County is considered rural. The counties have a total land area of 282,240 acres.

The counties are bounded on the west by the Chowan River and on the southwest and south by the Albemarle Sound. Elevation ranges from sea level to approximately 50 feet above sea level in the Snow Hill area of Chowan County.

General Nature of the Survey Area

This section gives general information concerning the county. It discusses settlement, water supply, and climate.

Settlement—Chowan County

Robert Ranson, Jr., soil scientist, Soil Conservation Service, helped prepare this section.

Explorers began entering the land along the Albemarle Sound and the Chowan River as early as 1586. The exact date and place of the first permanent settlement in what is now Chowan County is not known. However, there were families living around the mouth of the Chowan River by 1663 *(4)*.

The land these early settlers occupied was inhabited chiefly by a tribe of Chowanoke Indians. There was a smaller, allied tribe known as the Weapmeocs. The Weapmeocs had eight villages along the Albemarle Sound and its tributaries. The site of one of these villages, called Mascomeng, is believed to have been what is now Edenton. The Indians lived off the land by gathering food, fishing, hunting, and raising a few crops, such as corn, potatoes, melons, and tobacco.

In 1663, King Charles granted authority over an immense region south of Virginia to eight proprietors. The proprietors asked the governor of Virginia to appoint a governor to the new land being settled along the Albemarle Sound. This was the beginning of the province of Carolina.

By 1700 several large farms had been started between Edenton Bay and Sandy Point. Supplies for the settlers arrived on small ships from northern colonies and the West Indies. The settlers traded barrel staves, tar and pitch, tobacco, pork, and animal hides for salt, rum, and various tools.

The Town of Edenton was first known as "Ye Towne on Queen Anne's Creek." Edenton, named in honor of Governor Charles Eden, was incorporated in 1722. No other major towns were in the Chowan County area at that time. Chowan was the name of one of the original

precincts of Albemarle County in the province of Carolina.

Edenton became an important trading center as well as the seat of government for North Carolina. Edenton continued to be an important trade center until the opening of the Dismal Swamp Canal, which diverted commerce to Norfolk.

A big change in commerce for Chowan County came with the completion of a railroad from the north in 1881 and another across the Albemarle Sound to Mackey's Ferry in 1910. The railroads brought the big timber industry to Chowan County as well as a faster, more economical means of transportation of goods and people. The railroads joined the Albemarle area to the rest of North Carolina to the south and Virginia to the north.

Even with the railroads, Chowan County remained an agrarian society. Many people were employed by lumber and cotton mills, but most of the people earned their living by farming or through trade of farm products.

Fishing was an important industry that grew rapidly in the 1800's. The catch was chiefly herring. During the late 1800's through the mid 1900's, herring was a staple in the diet of most Chowan County residents.

The principal crops in Chowan County in the 18th and 19th centuries were corn, cotton, oats, sweet potatoes, wheat, peas, tobacco, and Irish potatoes. Cotton became the major money crop following the Civil War *(3)*.

Settlement—Perquimans County

Raymond A. Winslow, Jr., president, Perquimans County Historical Society, and secretary-archivist, Perquimans County Restoration Association, helped prepare this section.

As in Chowan County, settlers began arriving during the middle of the 1600's in what is now Perquimans County. Most of the land in this region was then occupied by the Yeopim Indians.

Most of Perquimans County's earliest settlements were on the Albemarle Sound, Perquimans River, Little River, and Yeopim River. Most of the settlers were from Virginia, but the New England merchants enticed some people to settle in the area and establish tobacco farms. A few of the first settlers moved to the area to avoid religious persecution, but the greatest lure was the land. Each man, woman, child, and servant who entered the province of Carolina was entitled to 50 acres of land. This was known as a "Head Right," which went to the person who paid for or was responsible for an individual's entrance into the province.

Perquimans, an Indian word reputed to mean land of beautiful women, was the name of one of the original precincts of Albemarle County. The precinct included the northern part of Tyrrell County and the eastern part of Gates County.

Hertford, named in honor of the Earl of Hertford, is the largest town in Perquimans County and is the county seat. Between 1726 and 1730 the first Perquimans County courthouse was constructed on Phelps Point in Hertford. Following the surveying and incorporation of Hertford in 1758, other buildings were constructed near the courthouse. The first lots were sold by lottery in 1759. Hertford was never a major trading center, but it handled much of the local trade.

Industrial growth following the completion of the first railroad was limited mainly to the lumber industry.

Between 1815 and 1840, many people, primarly Quakers, abolitionists, and others who did not own slaves, left the county. Many went to Indiana and a few to Ohio and Iowa. In a few cases, entire communities of Quakers left in an organized group. Slave owners also left to settle in Alabama, Georgia, Mississippi, Texas, and Arkansas. Throughout its history, Perquimans County has had only a small fluctuation in population.

Throughout the history of Perquimans County, agriculture has provided the livelihood for most county residents. The chief crop of the area has been corn. More recently, soybeans have become nearly as important and are now rotated with corn and winter wheat on most farms.

Water Supply

Ground water is the only source of water being used in Chowan and Perquimans Counties. Both Chowan and Perquimans Counties have county wide public water systems.

The counties are underlain by sedimentary deposits, which range from 1,500 to 3,000 feet in thickness. However, only the uppermost beds contain freshwater. The depth to saltwater ranges from 400 feet in the northwestern corner of Chowan County to 100 feet in the vicinity of the sound and estuaries.

The freshwater part of the upper sandy aquifer consists of sands, clays, and shells. Where the depth to saltwater is greater, the aquifer can yield several hundred gallons per minute of freshwater. In the immediate vicinity of the Albemarle Sound, yields are less than 50 gallons per minute. The fresh ground water in the counties tends to be hard and to contain excessive iron.

Chowan County is drained by several drainage systems. Warwick Creek, Dillard Creek, and Rocky Hock Creek flow westward to the Chowan River. Pollock Swamp flows southward to Pembroke Creek and into the Albemarle Sound. Burnt Mill Creek and Middleton Creek flow into the Yeopim River, and Queen Anne's Creek flows into the Albemarle Sound.

In Perquimans County, the Perquimans River bisects the county from north to south and flows into the Albemarle Sound. Little River, Yeopim River, Sulton

Creek, and Mill Creek also flow into the Albemarle Sound *(11).*

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Chowan and Perquimans Counties are hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool and has occasional brief cold spells. Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all crops.

Tables 1 and 2 give data on temperature and precipitation for the survey area in the period 1951 to 1978. Tables 3 and 4 show probable dates of the first freeze in fall and the last freeze in spring. Tables 5 and 6 provide data on length of the growing season. The climate information for Chowan County is based on data recorded at Edenton. The climate information for Perquimans County is based on data recorded at Elizabeth City, which is in adjacent Pasquotank County. This data is considered to be representative of the climatic conditions in Perquimans County.

In winter the average temperatures in Edenton and Elizabeth City are 44 and 43 degrees F, respectively, and the average daily minimum temperature is 34 degrees at Edenton and 33 degrees at Elizabeth City. The lowest temperature on record, which occurred at Elizabeth City on January 17, 1977, is 6 degrees. In summer the average temperature is 77 degrees at Edenton and Elizabeth City, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Elizabeth City on July 22, 1952, is 104 degrees.

Growing degree days are shown in tables 1 and 2. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 48 inches. Of this, 26 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 2.38 inches. The heaviest 1-day rainfall during the period of record was 6.62 inches at Edenton on July 28, 1965. Thunderstorms occur on about 40 days each year, and most occur in summer.

The average seasonal snowfall is 4 to 5 inches. The greatest snow depth at any one time during the period of record was 22 inches at Edenton and 26 inches at Elizabeth City. On an average of 1 day, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in spring.

Every few years a hurricane crosses the area.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of crops and native plants growing on the soils; and many factors about the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientist assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils

systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Perquimans County joins Pasquotank County. In the soil surveys of these two counties, the soil names and boundaries match with only a few exceptions. The minor differences are the result of minor inclusions or changes in the concept of a series as a result of refinements in soil classification.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Roanoke-Tomotley-Perquimans

Nearly level, poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil

The soils in this map unit are on broad flats and in depressions. This map unit makes up 37 percent of the survey area. It is 61 percent Roanoke soils, 21 percent Tomotley soils, 11 percent Perquimans soils, and 7 percent soils of minor extent. The soils of minor extent are the Portsmouth, Cape Fear, and Nimmo soils.

The surface layer of the Roanoke soils is grayish brown silt loam. The subsurface layer is light brownish gray silt loam. The subsoil is gray silty clay loam in the upper and lower parts and gray silty clay in the middle part. The underlying material is light brownish gray silt loam in the upper part and fine sandy loam in the lower part.

The surface layer of the Tomotley soils is dark grayish brown fine sandy loam. The subsoil is light gray fine sandy loam in the upper part and light brownish gray sandy clay loam in the lower part. The underlying material is mottled light brownish gray, gray, and yellowish brown sandy loam in the upper part and mottled yellowish brown, gray, and strong brown loamy sand in the lower part.

The surface layer of the Perquimans soils is grayish brown silt loam. The subsurface layer is light gray silt loam. The subsoil is gray silty clay loam in the upper part, grayish brown clay loam and gray silty clay loam in the middle part, and light brownish gray silt loam in the lower part.

The soils in this map unit are used mainly as cropland and, to a lesser extent, as woodland or pasture.

The soils in this map unit are well suited to use as cropland. They are poorly suited to most urban and recreational uses. Wetness is the main limitation.

2. Conetoe-Wando-Seabrook

Nearly level and gently sloping, well drained, excessively drained, and moderately well drained soils that have a sandy surface layer and a loamy or sandy subsoil

The soils in this map unit are on ridges and flats along small streams that flow into the Albemarle Sound and Chowan River. This map unit makes up 7 percent of the survey area. It is 30 percent Conetoe soils, 29 percent Wando soils, 20 percent Seabrook soils, and 21 percent soils of minor extent. The soils of minor extent are the Munden, Dragston, and Bojac soils.

The Conetoe soils are well drained. The surface layer is brown loamy sand. The subsurface layer is brownish yellow loamy fine sand. The subsoil is brownish yellow sandy loam in the upper part, strong brown sandy loam in the middle part, and brownish yellow loamy sand in the lower part. The underlying material is brownish yellow sand.

The Wando soils are excessively drained. The surface layer is dark grayish brown fine sand. The underlying material is fine sand that is yellowish brown in the upper part, brownish yellow in the middle part, and yellow in the lower part.

The Seabrook soils are moderately well drained. The surface layer is grayish brown fine sand. The underlying material is fine sand or sand that is very pale brown in the upper part and light gray in the lower part.

The soils in this map unit are used mainly as cropland and, to a lesser extent, as pasture or woodland.

The soils in this map unit are suited or well suited to use for crops and as woodland. They range from well suited to poorly suited to most urban uses. Wetness, leaching of plant nutrients, soil blowing, and droughtiness are the main limitations.

3. Tomahawk-Echaw-Valhalla

Nearly level and gently sloping, moderately well drained, somewhat poorly drained, and well drained soils that

have a sandy surface layer and a loamy or sandy subsoil

The soils in this map unit are on smooth to slightly rounded ridges along the Suffolk Scarp (fig. 1). This map unit makes up 6 percent of the survey area. It is 33 percent Tomahawk soils, 25 percent Echaw soils, 18 percent Valhalla soils, and 24 percent soils of minor extent. The soils of minor extent are the Cainhoy and Icaria soils.

The nearly level Tomahawk soils are moderately well drained and somewhat poorly drained. The surface layer is very dark grayish brown loamy fine sand. The subsurface layer is very pale brown loamy fine sand. The subsoil is brownish yellow fine sandy loam. Below that is fine sand that is light gray in the upper part, brown in the middle part, and black in the lower part. The underlying material is gray fine sand.

The nearly level Echaw soils are moderately well drained. The surface layer is dark gray fine sand. Below that is fine sand that is yellowish brown in the upper part, very pale brown in the middle part, and light gray in the lower part. The underlying material is dark grayish brown fine sand.

The nearly level and gently sloping Valhalla soils are well drained. The surface layer is brown fine sand. The subsurface layer is yellow fine sand. The subsoil is strong brown fine sandy loam in the upper part and yellowish brown loamy fine sand in the lower part. Below that is fine sand that is yellow and pale brown in the upper part, very dark grayish brown and light gray in the middle part, and black in the lower part.

The soils in this map unit are used mainly as cropland and, to a lesser extent, as pasture or woodland.

The soils are well suited or suited to use for crops and to use as woodland. Valhalla soils are suited to most urban uses and Tomahawk and Echaw soils range from suited to poorly suited. Wetness, leaching of plant

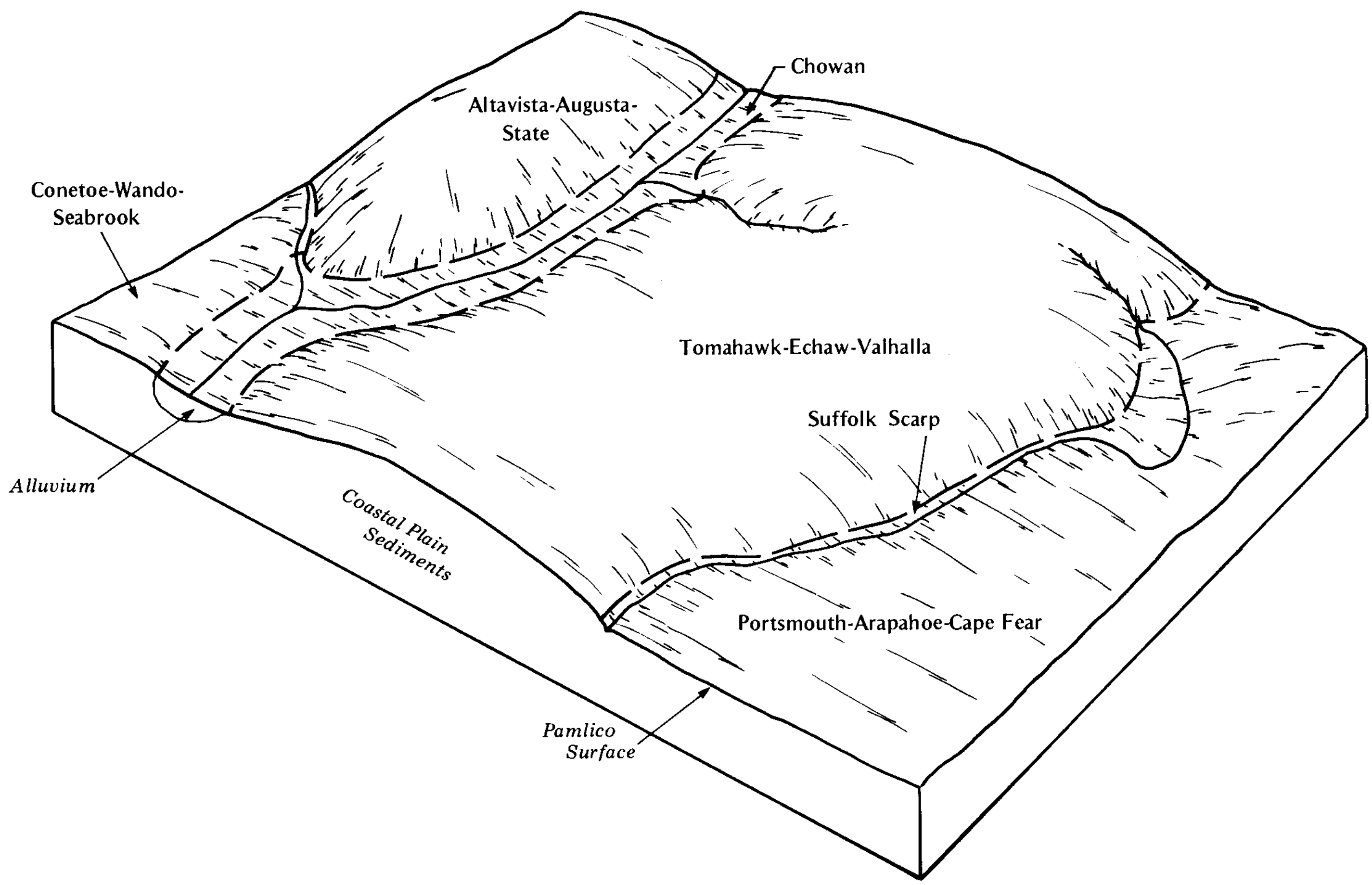


Figure 1.—The Suffolk Scarp is the remnant of an ancient coastline formation. The highest part of the formation is a broad sandy ridge immediately west of the scarp.

nutrients, the hazard of soil blowing, and droughtiness are the main limitations.

4. Dogue-Augusta-State

Nearly level and gently sloping, moderately well drained, somewhat poorly drained, and well drained soils that have a sandy or loamy surface layer and a loamy or clayey subsoil

The soils in this map unit are on smooth ridges along small streams that flow into the Albemarle Sound, Chowan River, and Perquimans River and are in shallow depressions. This map unit makes up 11 percent of the survey area. It is 38 percent Dogue soils, 23 percent Augusta soils, 22 percent State soils, and 17 percent soils of minor extent. The soils of minor extent are the Altavista, Wahee, Munden, Yeopim, Tomotley, and Dragston soils.

The Dogue soils are moderately well drained. The surface layer is brown fine sandy loam. The subsoil is brownish yellow sandy clay loam and clay in the upper part; yellowish brown and mottled yellowish brown, yellowish red, and gray clay in the middle part; and yellowish brown sandy clay loam in the lower part. The underlying material is yellowish brown sandy loam.

The Augusta soils are somewhat poorly drained. The surface layer is grayish brown fine sandy loam. The subsoil is pale brown fine sandy loam in the upper part, light brownish gray sandy clay loam in the middle part, and light gray sandy loam in the lower part. The underlying material is yellowish brown sandy loam.

The State soils are well drained. The surface layer is dark grayish brown loamy fine sand. The subsurface later is pale brown loamy fine sand. The subsoil is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material is brownish yellow sand.

The soils in this map unit are used mainly as cropland and, to a lesser extent, as pasture or woodland.

The soils are well suited to use for crops and as woodland. They range from well suited to poorly suited for most urban uses. Wetness is the main limitation.

5. Portsmouth-Arapahoe-Cape Fear

Nearly level, very poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil

The soils in this map unit are on broad flats and in depressions. This map unit makes up 23 percent of the survey area. It is 41 percent Portsmouth soils, 23 percent Arapahoe soils, 11 percent Cape Fear soils, and 25 percent soils of minor extent. The soils of minor extent are the Icaria, Tomotley, Roanoke, and Nimmo soils.

The surface layer of the Portsmouth soils is black loam. The subsurface layer is gray sandy loam. The subsoil is gray sandy clay loam. The underlying material is light brownish gray sand.

The surface layer of the Arapahoe soil is fine sandy loam that is black in the upper part and very dark grayish brown in the lower part. The subsoil is light brownish gray fine sandy loam. The underlying material is light gray. It is fine sand in the upper part, loamy sand in the middle part, and sand in the lower part.

The surface layer of the Cape Fear soil is black loam. The subsurface layer is light brownish gray loam. The subsoil is light brownish gray clay in the upper part; mottled gray, brownish yellow, and yellowish red sandy clay loam in the middle part; and light gray sandy loam in the lower part. The underlying material is gray loamy sand.

The soils in this map unit are used mainly as cropland or woodland.

The soils in this map unit, if drained, are well suited to cropland. They are poorly suited to most urban and recreational uses. Wetness is the main limitation.

6. Chapanoke-Yeopim

Nearly level and gently sloping, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy subsoil

The soils in this map unit are on smooth ridges and flats along small streams that flow into the Albemarle Sound and Perquimans River. This map unit makes up 4 percent of the survey area. It is 41 percent Chapanoke soils, 36 percent Yeopim soils, and 23 percent soils of minor extent. The soils of minor extent are the Altavista, Dogue, Wahee, Perquimans, and Augusta soils.

The Chapanoke soils are somewhat poorly drained. The surface layer is grayish brown silt loam. The subsoil is olive yellow loam in the upper part, light gray silty clay loam in the middle part, and gray silt loam in the lower part. The underlying material is gray loamy fine sand in the upper part and brownish yellow fine sand in the lower part.

The Yeopim soils are moderately well drained. The surface layer is grayish brown loam. The subsoil is yellowish brown loam in the upper part and yellowish brown clay loam in the lower part. The underlying material is loamy sand that is light gray in the upper part and yellowish brown in the lower part.

The soils in this map unit are used mainly as cropland and, to a lesser extent, as pasture or woodland.

The soils are well suited to use for crops and as woodland. They are suited or poorly suited to most urban uses. Wetness is the main limitation.

7. Chowan-Dorovan

Nearly level, very poorly drained soils that are loamy and are underlain by muck and soils that are muck throughout

The soils in this map unit are on the flood plains of the Albemarle Sound, Chowan River, Perquimans River, and of the small streams that flow into them. This map unit

makes up 9 percent of the survey area. It is about 51 percent Chowan soils and about 49 percent Dorovan soils.

The Chowan soils are very poorly drained. The surface layer is dark grayish brown silt loam. Below that is gray silty clay loam in the upper part and dark grayish brown silt loam in the lower part. The underlying material is black muck.

The Dorovan soils are very poorly drained. The surface layer is very dark brown muck. Below that is black muck.

The soils in this map unit are used almost exclusively as woodland.

The soils are poorly suited to use for crops, as woodland, and for most urban uses. Wetness, flooding, and low strength are the main limitations.

8. Scuppernong

Nearly level, very poorly drained soils that have a surface layer of muck and mucky and loamy underlying material

The soils in this map unit are in oval-shaped depressions and in the northern part of Perquimans County in the Dismal Swamp. This map unit makes up 3 percent of the county. It is 89 percent Scuppernong soils and 11 percent soils of minor extent. The soils of minor extent in the map unit are Portsmouth, Arapahoe, and Cape Fear soils.

The Scuppernong soils are very poorly drained. The surface layer is black muck. Below that is dark reddish brown muck. The underlying mineral soil is dark brown mucky loam in the upper part and mottled dark gray and greenish gray clay loam in the lower part.

The soils in this map unit are rapidly being cleared and used for cropland. To a lesser extent, they are used as woodland and wildlife habitat.

The soils, if drained, are suited or well suited to use for crops and as woodland. They are poorly suited to most urban uses. Wetness and low strength are the main limitations.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, State fine sandy loam, 0 to 2 percent slopes, is one phase in the State series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 7 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

AaA—Altavista fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on smooth ridges along small streams and rivers that flow into the Albemarle Sound, Chowan River, and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. The mapped areas are irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 6 inches thick. The subsurface layer is pale brown fine sandy loam 4 inches thick. The subsoil is 40 inches thick. It is light yellowish brown sandy clay loam in the upper part, brownish yellow sandy clay loam in the middle part, and brownish yellow sandy loam in the lower part. The underlying material to a depth of 72 inches is brownish yellow sandy loam in the upper part and yellowish brown sandy clay loam in the lower part.

Permeability is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is at a depth of about 1.5 to 2.5 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Augusta, Dogue, State, Munden, and Yeopim soils. Augusta soils are in small depressions. Dogue and State soils are on narrow side slopes near small streams. Munden and Yeopim soils occur at random within the map unit. Munden soils contain less clay than the Altavista soil, and Yeopim soils have more silt in the subsoil. The included soils make up about 15 percent of the map unit.

This Altavista soil is well suited to most local crops. Corn, peanuts, cotton, and soybeans are the dominant crops. Seasonal wetness is a limitation for some specialty crops, such as peanuts. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. The soil is well suited to pasture forages.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory is mainly dogwood, sweetbay, sourwood, American holly,

waxmyrtle, and sassafras. Wetness is the main limitation to woodland management.

This soil is suited to recreational uses and to sites for dwellings without basements. It is poorly suited to most other urban uses because of wetness.

This Altavista soil is in capability subclass IIw and in woodland group 2w.

Ap—Arapahoe fine sandy loam. This nearly level, very poorly drained soil is on broad flats and in depressions. Extensive areas of this soil are in the northern part of Perquimans County. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 1,000 acres.

Typically, the surface layer is 14 inches thick. It is black fine sandy loam in the upper part and very dark grayish brown fine sandy loam in the lower part. The subsoil is light brownish gray fine sandy loam 11 inches thick. The underlying material to a depth of 60 inches is light gray. It is fine sand in the upper part, loamy sand in the middle part, and sand in the lower part.

Permeability is moderately rapid. The surface layer and subsoil range from extremely acid to strongly acid, except in areas where the surface layer has been limed. The underlying material ranges from strongly acid to mildly alkaline. The seasonal high water table is at or near the surface in undrained areas. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Portsmouth and Cape Fear soils. Also included are small areas of soils that are sandy. Most of these included soils are near the outer edge of the delineations. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Arapahoe soil is well suited to most local crops. Corn and soybeans are the dominant crops (fig. 2). Wetness is the main limitation to use for crops. Spring tillage and fall harvest are often delayed because of wetness. Lack of suitable outlets and caving of cutbanks because of sandy layers are limitations to the installation and maintenance of drainage systems. This soil is well suited to pasture forages, such as fescue and Ladino clover.

The dominant trees are red maple, sweetgum, elm, yellow-poplar, river birch, water oak, and willow oak. The understory is cedar, American holly, sweetbay, sourwood, cane, and waxmyrtle. Wetness is the main limitation to woodland management.

This soil is generally not used for residential or recreational development. Wetness is the main limitation.

Figure 2.—Soybeans growing on Arapahoe fine sandy loam.

This Arapahoe soil is in capability subclass IIIw (drained) and in woodland group 2w.

At—Augusta fine sandy loam. This nearly level, somewhat poorly drained soil is in shallow depressions and on low, smooth ridges adjacent to small streams and waterways that flow into the Albemarle Sound, Chowan River, and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. The mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is grayish brown fine sandy loam 8 inches thick. The subsoil is 48 inches thick. It is pale brown fine sandy loam in the upper part, light brownish gray sandy clay loam in the middle part, and light gray sandy loam in the lower part. The underlying material to a depth of 64 inches is yellowish brown sandy loam.

Permeability is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is within 1 to 2 feet of the surface.

Included with this soil in mapping are small areas of Altavista, Tomotley, Dragston, and Wahee soils. Tomotley soils are in slight depressions. Altavista soils are on slightly elevated ridges. Dragston and Wahee soils are near the outer edge of delineations. The included soils make up about 10 to 15 percent of the map unit.

This Augusta soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation for cultivation. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. Augusta soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Augusta soil is in capability subclass IIIw and in woodland group 2w.

Au—Augusta-Urban land complex. This map unit consists of intermingled areas of somewhat poorly drained Augusta soil and Urban land, mostly in Edenton and Hertford. Augusta soil makes up about 70 percent of this complex and Urban land about 20 percent. The Augusta soil and Urban land are so intricately intermingled that it was not practical to map them separately at the scale selected for mapping.

Typically, the surface layer of the Augusta soil is grayish brown fine sandy loam 8 inches thick. The subsoil is 48 inches thick. It is pale brown fine sandy loam in the upper part, light brownish gray sandy clay loam in the middle part, and light gray sandy loam in the lower part. The underlying material to a depth of 64 inches is yellowish brown sandy loam.

Permeability is moderate, and the available water capacity is moderate. The soil is very strongly acid to medium acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is within 1 foot to 2 feet of the surface.

The Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise modified to the extent that most soil properties have been altered. These areas are now used for shopping centers, factories, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement.

Included with this complex in mapping are small cut and fill areas where the natural soil has been altered or covered. These areas are commonly near Urban land. Also included are small areas of Roanoke and Tomotley soils. The included soils make up about 10 percent of the map unit.

The hazards and limitations to the use of this Augusta soil are the same as for the Augusta fine sandy loam. Recommendations for use and management of the soils in this complex generally require onsite investigations.

This complex was not assigned to a capability subclass nor woodland group.

BoA—Bojac loamy fine sand, 0 to 3 percent slopes. This well drained soil is on convex ridges near small streams that flow into the Albemarle Sound and Chowan River. Most of the acreage of this soil is in the western part of Chowan County. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. Most mapped areas are oblong and irregular in width. They range from 5 to 70 acres.

Typically, the surface layer is brown loamy fine sand 7 inches thick. The subsurface layer is very pale brown loamy fine sand 6 inches thick. The subsoil is 22 inches thick and is brownish yellow. It is sandy loam in the upper part and loamy sand in the lower part. The underlying material to a depth of 72 inches is sand that is pale yellow in the upper part and light yellowish brown in the lower part.

Permeability is moderately rapid, and the available water capacity is low. The soil ranges from very strongly acid to slightly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is below a depth of 4 feet.

Included with this soil in mapping are small areas of Conetoe and State soils. Most of the included soils occur at random within the map unit with no apparent

change in landscape to indicate their presence. The included soils make up about 10 percent of the map unit.

This Bojac soil is well suited to most local crops. Peanuts, cotton, tobacco, corn, soybeans, and a variety of truck crops are the dominant crops. Leaching of plant nutrients, droughtiness, and susceptibility to wind erosion are the main limitations to use for crops. Winter cover crops, minimum tillage, and crop residue management help to control erosion and maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water and reduce leaching and soil blowing. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, hickory, American elm, black cherry, American beech, southern red oak, water oak, and white oak. The understory is mainly dogwood, sassafras, sourwood, and southern waxmyrtle.

This soil is well suited to most urban uses. The sandy material provides a good support base for most structures. However, the sandy surface is subject to soil blowing and is droughty when rainfall is limited. This soil is suited to most recreational uses. The sandy surface layer is the main limitation.

This Bojac soil is in capability subclass IIs and in woodland group 3o.

CaB—Cainhoy fine sand, 0 to 6 percent slopes. This somewhat excessive drained soil is on convex ridges along the Suffolk Scarp. Most of the acreage of this soil map is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 100 acres.

Typically, the surface layer is dark grayish brown fine sand 10 inches thick. Below that to a depth of 99 inches is fine sand that is yellowish brown and strong brown in the upper part, yellowish brown and light yellowish brown in the middle part, and light gray and dark gray in the lower part.

Permeability is rapid, and the available water capacity is low. The soil ranges from very strongly acid to slightly acid, except in areas where the surface layer has been limed.

Included with this soil in mapping are areas of Valhalla, Tomahawk, and Echaw soils. Most of the included soils are near the outer edge of delineations. Small areas of Echaw soils are in small depressions. The included soils make up about 15 percent of the map unit.

This Cainhoy soil is suited to a few crops, such as peaches, peanuts, and soybeans. It does not have sufficient moisture for most crops during the growing season (fig. 3). Leaching of plant nutrients, the hazard of soil blowing, and low available water capacity are the main limitations to use for crops. Blowing sand can damage young plants. Minimum tillage, crop residue management, windbreaks, and the inclusion of close growing grasses and legumes in the cropping system help to control soil blowing and conserve moisture. Fertilizers, particularly nitrogen, should be added in split applications. This soil is suited to pasture forages, such as coastal bermudagrass and bahiagrass.

The dominant native trees are loblolly pine, longleaf pine, sweetgum, southern red oak, blackjack oak, white oak, post oak, and red maple. The understory is mainly dogwood, sassafras, and American holly. The low available water capacity is the main limitation to woodland management.

This soil is well suited to most urban uses. The thick sandy materials provide a good support base for most structures. However, the unprotected sandy surface is subject to soil blowing and droughty when rainfall is limited. Unfiltered seepage from septic tank filter field lines can cause problems. This soil is suited to recreational uses. However, the sandy surface layer is a limitation.

This Cainhoy soil is in capability subclass IVs and in woodland group 3s.

Cf—Cape Fear loam. This nearly level, very poorly drained soil is on broad flats and in slight depressions. Large acreages are in the Bear Swamp area. Most of the acreage in this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 1,000 acres.

Typically, the surface layer is black loam 11 inches thick. The subsurface layer is light brownish gray loam 6 inches thick. The subsoil is 35 inches thick. It is light brownish gray clay in the upper part; mottled gray, brownish yellow, and yellowish red sandy clay loam in the middle part; and light gray sandy loam in the lower part. The underlying material to a depth of 62 inches is gray loamy sand.

Permeability is slow, and shrink-swell potential is moderate. The soil ranges from very strongly acid to medium acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Portsmouth and Roanoke soils. Most of the included soils are near the outer edge of delineations. Roanoke soils are on slightly elevated ridges. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Cape Fear soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Minimum tillage, cover crops, and the inclusion of grasses and legumes in the cropping rotation help to maintain tilth and production. Spring tillage and fall harvest can be delayed because of wetness. Lack of suitable outlets and slow permeability are limitations to the installation of drainage systems. This soil is well suited to pasture forages, such as fescue and Ladino clover.

Figure 3.—Drought stress is common in corn grown on Cainhoy fine sand, 0 to 6 percent slopes.

The dominant native trees are loblolly pine, red maple, hickory, sweetgum, elm, river birch, water oak, and willow oak. The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle.

This soil is poorly suited to most urban and recreational uses. Wetness and slow permeability are the main limitations. Low strength is a limitation for local roads and streets.

This Cape Fear soil is in capability subclass IIIw and in woodland group 1w.

Ch—Chapanoke silt loam. This nearly level, somewhat poorly drained soil is on low, smooth ridges and flats along small streams that flow into the Albemarle Sound and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. The mapped areas are irregular in shape and range from 10 to 50 acres.

Typically, the surface layer is grayish brown silt loam 6 inches thick. The subsoil is 44 inches thick. It is olive yellow loam in the upper part, light gray silty clay loam in the middle part, and gray silt loam in the lower part. The underlying material to a depth of 80 inches is gray loamy fine sand in the upper part and brownish yellow fine sand in the lower part.

Permeability is moderately slow, and the available water capacity is moderate. The soil ranges from extremely acid to medium acid throughout, except in

areas where the surface layer has been limed. The seasonal high water table is within 0.5 foot to 1.5 feet of the surface.

Included with this soil in mapping are small areas of Perquimans, Roanoke, Yeopim, and Wahee soils. Roanoke and Perquimans soils are in small depressions. Yeopim soils are on small knolls. Wahee soils are near the outer edge of delineations. The included soils make up about 10 percent of the map unit.

This Chapanoke soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Chapanoke soil is in capability subclass IIIw and in woodland group 2w.

CO—Chowan silt loam. This nearly level, very poorly drained soil is on flood plains of small streams that flow into the Albemarle Sound, Chowan River, and Perquimans River. All of the acreage of this map unit is in woodland. The mapped areas are oblong and are up to 500 acres.

Typically, the surface layer is dark grayish brown silt loam 6 inches thick. Below that, to a depth of 27 inches, is gray silty clay loam in the upper part and dark grayish brown silt loam in the lower part. The underlying material to a depth of 80 inches is black muck.

Permeability is moderately slow in the mineral horizon and moderately rapid to moderately slow in the organic horizon. The soil ranges from extremely acid to medium acid in the mineral horizon and is extremely acid or very strongly acid in the organic horizon. This soil is frequently flooded for very long periods.

Included with this soil in mapping are small areas of Dorovan muck. The Dorovan muck is commonly on the downstream side of the map unit. Also included are areas of soils that have overlying mineral material less than 16 inches thick. The included soils make up about 10 to 20 percent of the map unit.

The dominant native trees on this Chowan soil are green ash, pond pine, baldcypress, sweetgum, Atlantic white-cedar, water tupelo, and red maple (fig. 4). The understory is mainly sweetbay, greenbrier, sourwood, and giant cane. Wetness and poor trafficability are the main limitations to woodland management.

This soil is poorly suited to agricultural uses. Wetness and frequent flooding make it unsuitable for use as cropland.

This soil is poorly suited to urban and recreational uses because of the hazard of frequent flooding. Low strength is a limitation to local roads and streets.

This Chowan soil is in capability subclass VIIw and in woodland group 2w.

CtB—Conetoe loamy sand, 0 to 5 percent slopes. This well drained soil is on low ridges near the small streams that flow into the Albemarle Sound and Chowan River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland or pasture. Most mapped areas are oblong and irregular in width. They range from 5 to 500 acres.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsurface layer is brownish yellow loamy fine sand 18 inches thick. The subsoil is 35 inches thick. It is brownish yellow sandy loam in the upper part, strong brown sandy loam in the middle part, and brownish yellow loamy sand in the lower part. The underlying material to a depth of 82 inches is brownish yellow sand.

Permeability is moderately rapid, and the available water capacity is low. The soil ranges from very strongly acid to medium acid throughout, except in areas where the surface layer has been limed.

Included with this soil in mapping are small areas of Wando, Munden, and Bojac soils. Most of the included soils occur at random within the map unit with no apparent change in landscape to indicate their presence. Munden soils are in slight depressions. The included soils make up about 10 to 15 percent of the map unit.

This Contoe soil is well suited to peanuts. It is suited to most other local crops. Peanuts, tobacco, cotton, corn, soybeans, and a variety of truck crops are the dominant crops (fig. 5). The main limitations to use for crops, are leaching of plant nutrients, the hazard of soil blowing, and droughtiness. Blowing sand can damage young plants. Alternate planting of rows of small grain can help prevent damage to young tender plants, such as watermelons. Winter cover crops, minimum tillage, and crop residue management help to reduce soil blowing and conserve moisture. No-till planting, windbreaks, and crop rotations that include close growing crops also help to conserve soil and water. Fertilizers, particularly nitrogen, should be added in split applications. This soil is well suited to pasture forages, such as coastal bermudagrass and bahiagrass.

The dominant native trees are loblolly pine, longleaf pine, red maple, hickory, sweetgum, black tupelo, southern red oak, white oak, and post oak. The understory is mainly dogwood, sassafras, American holly, and sourwood. Low available water capacity is the main limitation to woodland management.

Figure 4.—This wooded first bottom is in an area of Chowan silt loam.

This soil is well suited to most urban uses. The thick sandy material provides a good support base for most structures. However, the unprotected sandy surface is subject to soil blowing and is droughty when rainfall is limited. The soil is suited to recreational uses.

This Conetoe soil is in capability subclass IIs and in woodland group 3s.

DgA—Dogue fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on smooth ridges near the small streams that flow into the Albemarle Sound, Chowan River, and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland or pasture. The mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown fine sandy loam 8 inches thick. The subsoil is 58 inches thick. It is brownish yellow sandy clay loam and clay in the upper part; yellowish brown and mottled yellowish brown, yellowish red, and gray clay in the middle part; and yellowish brown sandy clay loam in the lower part. The underlying material to a depth of 72 inches is yellowish brown sandy loam.

Permeability is moderately slow, the available water capacity is moderate, and shrink-swell potential is

Figure 5.—Conetoe loamy sand, 0 to 5 percent slopes, is one of the few soils in the survey area that is suited to tobacco.

moderate. The soil ranges from extremely acid to strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is 1.5 to 3 feet below the surface.

Included with this soil in mapping are small areas of State, Altavista, and Wahee soils. Wahee soils are in slight depressions and drainageways. Most of the included soils are near the outer edge of delineations. The included soils make up about 10 percent of the map unit.

This Dogue soil is well suited to most local crops. Corn, tobacco, cotton, peanuts, and soybeans are the dominant crops (fig. 6). Seasonal wetness is a limitation for some specialty crops, such as tobacco and peanuts. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. Moderately slow permeability of the subsoil is a limitation to the installation of drainage systems. This soil is well suited to pasture forages.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory is mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation to woodland management.

This soil is poorly suited to urban uses because of wetness and moderately slow permeability. It is suited to recreation.

This Dogue soil is in capability subclass IIw and in woodland group 2w.

DgB—Dogue fine sandy loam, 2 to 6 percent slopes. This moderately well drained soil is on slightly rounded ridges near small streams that flow into the Chowan River, Perquimans River, and Albemarle Sound. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland or pasture. The mapped areas are oblong and irregular in width. They commonly range from 10 to 30 acres.

Typically, the surface layer is brown fine sandy loam 8 inches thick. The subsoil is 58 inches thick. It is brownish yellow sandy clay loam and clay in the upper part; yellowish brown and mottled yellowish brown, yellowish red, and gray clay in the middle part; and yellowish brown sandy clay loam in the lower part. The underlying material to a depth of 72 inches is yellowish brown sandy loam.

Permeability is moderately slow, the available water capacity is moderate, and shrink-swell potential is moderate. The soil ranges from extremely acid to strongly acid throughout, except in the areas where the surface layer has been limed. The seasonal high water table is 1.5 to 3 feet below the surface.

Included with this soil in mapping are small areas of State, Altavista, and Wahee soils. Most of the included soils are on the outer edge of delineations. Also included are soils near drainageways that have slopes of more than 6 percent. The included soils make up about 10 to 20 percent of the map unit.

This Dogue soil is well suited to most local crops. Corn, peanuts, cotton, tobacco, and soybeans are the dominant crops. Seasonal wetness is a limitation for some specialty crops, such as tobacco and peanuts. Conservation measures in row crops help to control the moderate hazard of erosion on the gentle slopes. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. Moderately slow permeability of the subsoil is a limitation to the installation of drainage systems. This soil is well suited to pasture forages.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American

Figure 6.—Cotton growing on Dogue fine sandy loam, 0 to 2 percent slopes.

beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory is mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation for woodland use and management.

This soil is poorly suited to urban uses because of wetness, low strength, and moderately slow permeability. It is suited to recreational uses. Wetness is the main limitation.

This Dogue soil is in capability subclass IIe and in woodland group 2w.

DO—Dorovan muck. This nearly level, very poorly drained soil is on the flood plains of the Albemarle Sound, Chowan River, Perquimans River, and major streams. Most of the acreage of this map unit is in woodland. The mapped areas are oblong and range from 50 to 300 acres.

Typically, the surface layer is very dark brown muck 3 inches thick. Below that to a depth of 96 inches is black muck.

This soil is highly decomposed organic matter. Permeability is moderate. The soil is extremely acid. The seasonal high water table is at or near the surface. The soil is subject to frequent flooding for very long periods.

Included with this soil in mapping are small areas of Chowan soils. Chowan soils are at the upstream edge of the map unit. Also included are areas of soils that have muck less than 51 inches thick. The included soils make up about 15 to 20 percent of the map unit.

The dominant native trees on this Dorovan muck are ash, pond pine, baldcypress, swamp tupelo, water tupelo, and red maple. The understory is mainly redbay, greenbrier, and waxmyrtle. Wetness and poor trafficability are the main limitations to woodland management.

This soil is poorly suited to agricultural uses. Wetness and frequent flooding make it unsuitable for use as cropland.

This soil is poorly suited to urban and recreational uses. Frequent flooding is the main limitation.

This Dorovan soil is in capability subclass VIIw and in woodland group 4w.

Ds—Dragston loamy fine sand. The nearly level, somewhat poorly drained soil is near small streams that flow into the Albemarle Sound, Chowan River, and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 7 inches thick. The subsurface layer is very pale brown loamy fine sand 3 inches thick. The subsoil is 26 inches thick. It is brownish yellow sandy loam in the upper part; light brownish gray sandy loam in the middle part; and mottled yellowish brown, light gray, and very pale brown loamy sand in the lower part. The underlying material to a depth of 68 inches is sand that is white in the upper part and light gray in the lower part.

Permeability is moderately rapid, and the available water capacity is high. The soil is very strongly acid or strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is within 1 foot to 2.5 feet of the surface.

Included with this soil in mapping are small areas of Munden, Altavista, and Nimmo soils. Altavista and Munden soils are on slightly elevated knolls or ridges. Nimmo soils are in slight depressions. The included soils make up about 10 to 20 percent of the map unit.

This Dragston soil is well suited to most local crops. Peanuts, corn, soybeans, and a variety of truck crops are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

The Dragston soil is in capability subclass IIw and in woodland group 2w.

Ec—Echaw fine sand. This nearly level, moderately well drained soil is on smooth ridges along the Suffolk Scarp. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 50 to 100 acres.

Typically, the surface layer is dark gray fine sand 8 inches thick. Below that, to a depth of 36 inches, is fine sand. It is yellowish brown in the upper part, very pale brown in the middle part, and light gray in the lower part. The subsoil to a depth of 64 inches is dark grayish brown fine sand.

Permeability is moderately rapid to rapid, and the available water capacity is low. The soil ranges from very strongly acid to medium acid, except in areas where the surface layer has been limed. The seasonal high water table is 2.5 to 5 feet below the surface.

Included with this soil in mapping are small areas of Tomahawk and Cainhoy soils. Most of the included soils are near the outer edge of delineations. The included soils make up about 10 to 15 percent of the map unit.

This Echaw soil is suited to most local crops. Corn, peanuts, soybeans, and a variety of truck crops are the dominant crops (fig. 7). The hazard of soil blowing, leaching of plant nutrients, and the low available water

capacity are the main limitations to use for crops. Blowing sand can damage young plants. Minimum tillage, crop residue management, windbreaks, and the inclusion of close growing grasses and legumes in the cropping system help to control soil blowing and conserve moisture. This soil is suited to pasture forages, such as coastal bermudagrass and bahiagrass.

The dominant native trees are loblolly pine, red oak, blackjack oak, white oak, post oak, and red maple. The understory is mainly dogwood, sassafras, and American holly. The low available water capacity is the main limitation to woodland management.

This soil is suited to or poorly suited to most urban uses. Wetness is the main limitation. Unfiltered seepage from septic tank filter field lines is also a problem. This soil is suited to recreational uses; however, the sandy surface layer is a limitation.

This Echaw soil is in capability subclass IIIs and in woodland group 3s.

Ic—Icaria fine sandy loam. This nearly level, poorly drained soil is on flats and in depressions along the Suffolk Scarp. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 400 acres.

Typically, the surface layer is black fine sandy loam 11 inches thick. The subsoil is grayish brown sandy clay loam 14 inches thick. Below that to a depth of 60 inches is brown loamy sand in the upper part, very dark gray

Figure 7.—Watermelons growing on Echaw fine sand.

sand in the middle part, and dark brown sand in the lower part.

Permeability is moderate. The soil ranges from extremely acid to strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Echaw and Tomahawk soils. Most of the included soils are near the outer edge of delineations. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Icaria soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Minimum tillage, cover crops, and the inclusion of grasses and legumes in the conservation cropping system help to maintain tilth. Tillage can be delayed in spring because of wetness. Lack of suitable outlets is a limitation to the installation of drainage systems. This soil is well suited to pasture forages, such as fescue and Ladino clover.

The dominant trees are loblolly pine, baldcypress, pond pine, red maple, green ash, sweetgum, black tupelo, swamp tupelo, elm, yellow-poplar, river birch, water oak, and willow oak. The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation for woodland use and management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Icaria soil is in capability subclass IIIw and in woodland group 2w.

Ly—Lynn Haven sand. This nearly level, very poorly drained soil is on flats or rims of oval depressions. Most of the acreage of this map unit is in woodland. The rest is mainly in cultivated crops. The mapped areas are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is black sand 10 inches thick. The subsurface layer is gray fine sand 6 inches thick. The subsoil is fine sand to a depth of 64 inches. It is dark reddish brown in the upper part and reddish brown in the lower part.

Permeability is moderately rapid or moderate. The soil ranges from extremely acid to strongly acid, except in areas where the surface layer has been limed. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Arapahoe and Icaria soils. Also included are soils that do not have a dark surface layer. The included soils occur at random within the map unit with no apparent change in landscape to indicate their presence. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Lynn Haven soil is suited to corn, soybeans, and small grain. Minimum tillage, cover crops, and the inclusion of grasses and legumes in the conservation cropping system help to maintain tilth. Spring tillage and fall harvest can be delayed because of wetness. Lack of suitable outlets is a limitation to the installation of drainage systems. This soil is well suited to pasture forages, such as common bermudagrass and bahiagrass.

The dominant trees are pond pine, red maple, green ash, sweetgum, elm, yellow-poplar, water oak, and willow oak. The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Lynn Haven soil is in capability subclass IVw and in woodland group 3w.

MuA—Munden loamy fine sand, 0 to 2 percent slopes. This moderately well drained soil is on smooth low ridges in the western part of Chowan County. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 30 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 8 inches thick. The subsurface layer is pale yellow loamy fine sand 6 inches thick. The subsoil is fine sandy loam 22 inches thick. It is light yellowish brown in the upper part and brownish yellow in the lower part. The underlying material to a depth of 62 inches is pale yellow loamy fine sand in the upper part; mottled light grey, white, and light olive brown fine sandy loam in the middle; and mottled yellowish brown and white fine sandy loam in the lower part.

Permeability is moderate in the subsoil and moderately rapid in the underlying material. The available water capacity is low. The soil ranges from very strongly acid to medium acid, except in areas where the surface layer has been limed. The seasonal high water table is at a depth of about 1.5 to 2.5 feet.

Included with this soil in mapping are small areas of Bojac, Dragston, Nimmo, and Altavista soils. Bojac soils are on slightly elevated ridges. Nimmo and Dragston soils are in slight depressions. Altavista soils occur at random within this map unit with no apparent change in landscape to indicate their presence. The included soils make up about 10 to 15 percent of the map unit.

This Munden soil is well suited to most local crops. Peanuts, cotton, corn, soybeans, and a variety of truck crops are the dominant crops (fig. 8). Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that included close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

Figure 8.—Munden loamy fine sand, 0 to 2 percent slopes, is an excellent soil for peanuts.

This soil is poorly suited to most urban uses because of wetness. Extensive drainage and site modifications improve the potential as sites for dwellings that have septic tank absorption fields. This soil is suited to most recreational uses. Wetness is the main limitation.

This Munden soil is in capability subclass IIw and in woodland group 2w.

Nm—Nimmo loamy fine sand. This nearly level, poorly drained soil is on low, smooth ridges and in depressions. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. Mapped areas are irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 6 inches thick. The subsoil is light brownish gray fine sandy loam 19 inches thick. The underlying material to a depth of 60 inches is light gray and mottled white, brownish yellow, and strong brown

sand in the upper part; bluish gray sandy loam in the middle part; and gray sand in the lower part.

Permeability is moderate in the subsoil and moderately rapid in the underlying material. The soil ranges from extremely acid to strongly acid except in areas where the surface layer has been limed. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Dragston and Tomotley soils. Dragston soils are on slightly elevated ridges. Tomotley soils occur at random within the map unit with no apparent change in landscape to indicate its presence. The included soils make up about 10 to 15 percent of the map unit.

This Nimmo soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to urban and recreational uses. Wetness and the seasonal high water table are the main limitations.

This Nimmo soil is in capability subclass IIIw and in woodland group 2w.

Pe—Perquimans silt loam. This nearly level, poorly drained soil is on flats and in depressions near small streams that flow into the Albemarle Sound. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. The mapped areas are irregular in shape and range from 10 to 300 acres.

Typically, the surface layer is grayish brown silt loam 5 inches thick. The subsurface layer is light gray silt loam 3 inches thick. The subsoil to a depth of 62 inches is gray silty clay loam in the upper part, grayish brown clay loam and gray silty clay loam in the middle part, and light brownish gray silt loam in the lower part.

Permeability is moderately slow. The soil is very strongly acid or strongly acid, except in areas where the surface layer has been limed. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Roanoke, Chapanoke, and Tomotley soils. Chapanoke soils are on slightly elevated ridges. Roanoke and Tomotley soils occur at random within the map unit with no apparent change in landscape to indicate their presence. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Perquimans soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Perquimans soil is in capability subclass IIIw and in woodland group 2w.

Pt—Portsmouth loam. This nearly level, very poorly drained soil is commonly on broad flats in the Bear Swamp and Dismal Swamp areas. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 600 acres.

Typically, the surface layer is black loam 12 inches thick. The subsurface layer is gray sandy loam to a depth of 16 inches. The subsoil is gray sandy clay loam 20 inches thick. The underlying material to a depth of 60 inches is light brownish gray sand.

Permeability is moderate in the subsoil and rapid or very rapid in the underlying material. The soil ranges from extremely acid to strongly acid in the upper part, except in areas where the surface layer has been limed. The underlying material ranges from extremely acid to medium acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Cape Fear and Arapahoe soils. Most of the included soils are near the outer edge of the map unit. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Portsmouth soil is well suited to most local crops. Corn, soybeans, and a variety of truck crops are the dominant crops. Wetness is the main limitation to use for crops. Minimum tillage, cover crops, and the inclusion of grasses and legumes in the conservation cropping system help to maintain tilth. Tillage can be delayed in spring because of wetness. Lack of suitable outlets is a limitation to the installation of drainage systems. The soil is well suited to pasture forages, such as fescue and Ladino clover.

The dominant trees are loblolly pine, baldcypress, pond pine, red maple, green ash, sweetgum, black tupelo, swamp tupelo, elm, yellow-poplar, river birch, water oak, and willow oak. The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and

waxmyrtle. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban uses because of wetness and the hazard of flooding. It is poorly suited to most recreational uses because of wetness.

This Portsmouth soil is in capability subclass IIIw and in woodland group 1w.

Ro—Roanoke silt loam. This nearly level, poorly drained soil is on broad flats and in depressions. Large areas of this soil are in the Durants Neck, New Hope, and Harvey Point areas of Perquimans County and in the Yeopim area of Chowan County. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 300 acres.

Typically, the surface layer is grayish brown silt loam 5 inches thick. The subsurface layer is light brownish gray silt loam 3 inches thick. The subsoil is 35 inches thick. It is gray silty clay loam in the upper part, gray silty clay in the middle part, and gray silty clay loam in the lower part. The underlying material to a depth of 72 inches is light brownish gray silt loam in the upper part and light brownish gray fine sandy loam in the lower part.

Permeability is slow, and shrink-swell potential is moderate. The soil is very strongly acid or strongly acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Perquimans, Wahee, Tomotley, and Cape Fear soils. Wahee soils are on slightly elevated ridges. Cape Fear soils are in slight depressions and in drainageways. Tomotley and Perquimans soils occur at random within the map unit with no apparent change in landscape to indicate their presence. Also included are small areas of Roanoke soils that have slopes of more than 2 percent. They are adjacent to small streams primarily in the Yeopim, Durants Neck, New Hope, and Harvey Point areas. The included soils make up about 10 percent of the map unit.

If drained, this Roanoke soil is well suited to corn, soybeans, and small grain. It is poorly suited to tobacco, cotton, and peanuts. Wetness is the main limitation to use for crops. Minimum tillage, cover crops, and the inclusion of grasses and legumes in the conservation cropping system help to maintain tilth. Spring tillage and fall harvest can be delayed because of wetness. Lack of suitable outlets and slow permeability are limitations to the installation of drainage systems. This soil is well suited to pasture forages, such as fescue and Ladino clover.

The dominant native trees are loblolly pine, red maple, sweetgum (fig. 9). The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness and the hazard of flooding are the main limitations.

This Roanoke soil is in capability subclass IIIw and in woodland group 1w.

Sc—Scuppernong muck. This nearly level, very poorly drained soil is in oval depressions and in the northern part of Perquimans County in the Dismal Swamp. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 100 to 200 acres.

Typically, the surface layer is 36 inches thick. It is black muck in the upper part and dark reddish brown muck in the lower part. The underlying mineral soil to a depth of 72 inches is dark brown mucky loam in the upper part and mottled dark gray and greenish gray clay loam in the lower part.

The surface layer is highly decomposed organic matter. Permeability is moderately slow to moderately rapid. The organic layer is extremely acid, except in areas where it has been limed. The underlying mineral layer ranges from extremely acid to strongly acid. Many logs, roots, and stumps are present throughout the organic and mineral layers in most areas. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Arapahoe and Portsmouth soils. The soils occur at random within the map unit with no apparent change in landscape to indicate their presence. The included soils make up about 10 to 15 percent of the map unit.

If drained and properly managed, this Scuppernong soil is suited to crops. Corn and soybeans are the dominant crops. Large applications of lime and the addition of copper and other micronutrients are necessary for crops. The many logs, roots, and stumps present in the organic layer have to be removed before cultivation. Spring tillage and fall harvest can be delayed because of wetness. During spring planting, soil blowing can occur. Minimum tillage, field borders, and windbreaks reduce the chance of soil blowing.

The dominant native trees are red maple, sweetgum, baldcypress, and blackgum. The understory is mainly inkberry, fetterbush lyonia, huckleberry, greenbrier, waxmyrtle, and switchcane. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness and the hazard of flooding are the main limitations. Low strength is a limitation for local roads and streets.

This Scuppernong soil is in capability subclass IVw and in woodland group 4w.

Se—Seabrook fine sand. This nearly level, moderately well drained soil is on low ridges and flats

Figure 9.—A loblolly pine plantation in an area of Roanoke silt loam.

along small streams and rivers that flow into the Albemarle Sound and Chowan River. It is most common in the western part of Chowan County. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is grayish brown fine sand 10 inches thick. The subsoil is light gray fine sand 20 inches thick. The underlying material to a depth of 80 inches is light gray fine sand or sand.

Permeability is rapid, and the available water capacity is low. The upper part of the soil is strongly acid or medium acid, and the lower part ranges from very strongly acid to slightly acid. The seasonal high water table is 2 to 4 feet below the surface.

Included with this soil in mapping are small areas of Dragston, Munden, and Wando soils. Most of the included soils are near the outer edge of delineations. The included soils make up about 10 percent of the map unit.

This Seabrook soil is suited to most local crops. Peanuts, corn and soybeans are the dominant crops. Wetness and the hazard of soil blowing are the main limitations to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds.

This soil is poorly suited to most urban uses because of wetness. This soil is poorly suited to most recreational uses because of the fine sand surface layer.

This Seabrook soil is in capability subclass IIIs and in woodland group 3s.

StA—State loamy fine sand, 0 to 2 percent slopes. This well drained soil is on low ridges near the small

streams that flow into the Albemarle Sound, Chowan River, and Perquimans River. Most of the acreage in this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 7 inches thick. The subsurface layer is pale brown loamy fine sand 6 inches thick. The subsoil is 29 inches thick. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow sand.

Permeability is moderate, and the available water capacity is high. The soil is very strongly acid or strongly acid in the upper part and very strongly acid to medium acid in the lower part. The seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are small areas of Altavista, Augusta, Bojac, and Conetoe soils. The Altavista and Augusta soils are in shallow depressions. Most of the other included soils are near the outer edge of delineations. The included soils make up about 10 to 15 percent of the map unit.

This State soil is well suited to corn, soybeans, peanuts, cotton, tobacco, and small grains. Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, red maple, hickory, yellow-poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory is mainly dogwood, sassafras, and waxmyrtle.

This soil is well suited to most urban and recreational uses.

This State soil is in capability class I and in woodland group 1o.

StB—State loamy fine sand, 2 to 6 percent slopes. This well drained soil is on slightly rounded ridges near streams that flow into the Albemarle Sound and Roanoke River. Most of the acreage of this soil is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 35 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 7 inches thick. The subsurface layer is pale brown loamy fine sand 6 inches thick. The subsoil is 29 inches thick. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow sand.

Permeability is moderate to moderately rapid, and the available water capacity is high. The soil is very strongly acid or strongly acid in the upper part and very strongly acid to medium acid in the lower part. The seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are small areas of Altavista, Dogue, Bojac, and Conetoe soils. Also included are soils that have slopes of more than 6 percent. These soils are along the edges of small streams. Most of the included soils are near the outer edge of delineations. The included soils make up about 15 percent of the map unit.

This State soil is well suited to corn, soybeans, peanuts, tobacco, cotton, and small grains. The hazard of erosion is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to control runoff and erosion and to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, red maple, hickory, yellow-poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory is mainly dogwood, sassafras, sourwood, and waxmyrtle.

This soil is well suited to most urban and recreational uses.

This State soil is in capability subclass IIe and in woodland group 1o.

SuA—State-Urban land complex, 0 to 2 percent slopes. This map unit consists of intermingled areas of well drained State soil and Urban land, mainly in Edenton and Hertford. State soil makes up about 50 to 60 percent of this complex and the Urban land about 15 percent. The State soil and Urban land are so intricately intermingled that it was not practical to separate them at the scale selected for mapping.

Typically, the surface layer of State soil is dark grayish brown loamy fine sand 7 inches thick. The subsurface layer is pale brown loamy fine sand 6 inches thick. The subsoil is 29 inches thick. It is strong brown sandy clay loam in the upper part and yellowish brown fine sandy loam in the lower part. The underlying material to a depth of 60 inches is brownish yellow sand.

Permeability is moderate to moderately rapid, and the available water capacity is high. The soil is very strongly acid or strongly acid in the upper part and very strongly acid to medium acid in the lower part. The seasonal high water table is 4 to 6 feet below the surface.

The Urban land consists of areas where the original soil has been cut, filled, graded, paved, or otherwise modified to the extent that most soil properties have been altered. These areas are now used for shopping centers, factories, homes, municipal buildings, apartment complexes, parking lots, or other uses where buildings are closely spaced or the soil is covered with pavement.

Included with this complex in mapping are small cut and fill areas where natural soil has been altered or

covered. These areas are commonly near the Urban land. Also included are areas of Dogue, Altavista, and Conetoe soils. The included soils make up about 25 to 35 percent of the map unit.

The hazards and limitations to the use of this State soil are the same as those noted for the State loamy fine sand, 0 to 2 percent slopes. Recommendations for use and management of the soil in this complex generally require onsite investigations.

This complex was not assigned to a capability subclass nor woodland group.

Tm—Tomahawk loamy fine sand. This nearly level, moderately well drained and somewhat poorly drained soil is on smooth ridges along the Suffolk Scarp. Most of the acreage in this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is very dark grayish brown loamy fine sand 8 inches thick. The subsurface layer is very pale brown loamy fine sand 13 inches thick. The subsoil is brownish yellow fine sandy loam 9 inches thick. Below that, to a depth of 55 inches, is fine sand that is light gray in the upper part, brown in the middle part, and black in the lower part. Gray fine sand extends to a depth of 62 inches.

Permeability is rapid in the surface and subsurface layers, moderately rapid in the subsoil, and moderate below the subsoil. The soil is very strongly acid or strongly acid in the upper part and very strongly acid to slightly acid in the lower part. The seasonal high water table is 1.5 to 3 feet below the surface.

Included with this soil in mapping are small areas of Valhalla and Echaw soils. Valhalla soils are on slightly elevated knolls or ridges. Echaw soils occur at random within the map unit with no apparent change in landscape to indicate their presence. The included soils make up about 10 percent of the map unit.

This Tomahawk soil is well suited to most local crops. Peanuts, corn, and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to or suited to most urban uses because of wetness. It is suited to recreational uses. Wetness and the sandy surface layer are the main limitations to recreational use.

This Tomahawk soil is in capability subclass IIw and in woodland group 3w.

To—Tomotley fine sandy loam. This nearly level, poorly drained soil is on flats and in slight depressions. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in pasture or woodland. The mapped areas are irregular in shape and range from 10 to 150 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 7 inches thick. The subsoil is 35 inches thick. It is light gray fine sandy loam in the upper part and light brownish gray sandy clay loam in the lower part. The underlying material to a depth of 72 inches is mottled light brownish gray, gray, and yellowish brown sandy loam in the upper part and mottled yellowish brown, gray, and strong brown loamy sand in the lower part.

Permeability is moderate to moderately slow. The soil ranges from extremely acid to strongly acid in the upper part, except in areas where the surface layer has been limed. Below a depth of about 50 inches, it ranges from extremely acid to medium acid. The seasonal high water table is at or near the surface. This soil is subject to rare flooding.

Included with this soil in mapping are small areas of Augusta, Perquimans, Roanoke, and Portsmouth soils. Augusta soils are on slightly elevated ridges. Roanoke and Perquimans soils occur at random within the map unit with no apparent change in landscape to indicate their presence. Portsmouth soils are in small depressions. The included soils make up about 10 to 15 percent of the map unit.

If drained, this Tomotley soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and crop rotations that include close growing crops help to conserve soil and water. The soil is well suited to pasture forages.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow-poplar, willow oak, water oak, black cherry, and American beech. The major understory is dogwood, sourwood, sweetbay, sassafras, and a variety of briers and reeds. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban uses because of wetness and the hazard of flooding. It is poorly suited to most recreational uses because of wetness.

This Tomotley soil is in capability subclass IIIw and in woodland group 2w.

UD—Udorthents, loamy. This map unit consists of areas of altered soil where the normal soil profile has either been destroyed or covered by grading and digging operations. Three distinct types of altered areas are

borrow pit, dredge and fill, and landfill. Each of these types is identified on the soil map. They are mapped as a single map unit because they are mostly loamy and are capable of supporting vegetative growth.

The borrow pits are excavated areas from which the soil material has been removed for use as fill for construction. The cuts are from 3 to 15 feet deep. The base slope in these cuts is level to gently sloping. Most cuts have two or more short, nearly vertical side slopes. The exposed surface layer consists mainly of loamy, marine deposits. The borrow pits range from 2 to 5 acres. Some of the borrow pits have been reclaimed and seeded to grass. A few areas of soils have naturally reseeded to wild grasses, weeds, and pine. The areas are poorly suited to plant growth because of the physical properties and low natural fertility of the soil.

The dredge and fill areas of this map unit are commonly near the built-up areas along the Albemarle Sound and along the edge of the major river systems. Typically, dredged material is used to construct fill areas to improve sites for more intensive use, such as building sites. In some areas, borrow material has been hauled in and placed on the low, wet soil area to improve site quality.

Landfills are areas used for disposing of solid waste by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered with a thin layer of soil. When the trench is full, a final cover of soil material is placed over the landfill.

Recommendations for use and management of soil in this map unit require onsite investigation.

This map unit was not assigned to a capability subclass nor woodland group.

Ur—Urban land. Urban land consists of areas where more than 85 percent of the area is covered with streets, buildings, parking lots, railroad yards, and airports. Nearly all of the acreage of this map unit is in the business district of Edenton and Hertford, around the perimeter of these cities, or at the Edenton Municipal Airport. Isolated areas are a minimum of 5 acres. Slopes range from 0 to 6 percent.

Surface water runoff from roofs, roads, parking lots, and other impervious covering can increase the hazard of flooding on low-lying areas.

Recommendations for use and management of soil in this map unit require an onsite investigation.

This map unit was not assigned to a capability subclass nor woodland group.

VaB—Valhalla fine sand, 0 to 6 percent slopes. This well drained soil is on smooth to slightly rounded ridges along the Suffolk Scarp. Most of the mapped areas are oblong and irregular in width. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland or pasture. They range from 5 to 100 acres.

Typically, the surface layer is brown fine sand 10 inches thick. The subsurface layer is yellow fine sand 11 inches thick. The subsoil is 19 inches thick. It is strong brown fine sandy loam in the upper part and yellowish brown loamy fine sand in the lower part. Below that to a depth of 99 inches is fine sand that is yellow and very pale brown in the upper part, very dark grayish brown and light gray in the middle part, and black in the lower part.

Permeability is rapid, and the available water capacity is low. The soil ranges from very strongly acid to medium acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is below a depth of 4 feet.

Included with this soil in mapping are small areas of Tomahawk, Cainhoy, and Echaw soils. Cainhoy soils occur at random within the map unit with no apparent change in landscape to indicate their presence. Echaw and Tomahawk soils are in small depressions. The included soils make up about 10 to 15 percent of the map unit.

This Valhalla soil is well suited to peanuts and suited to most other local crops. Peanuts, corn, and soybeans are the dominant crops. The main limitations to use for crops are leaching of plant nutrients, soil blowing, and droughtiness. Blowing sand can damage young plants. Alternate planting of rows of small grain can help to prevent damage to young tender plants, such as watermelons. Winter cover crops, minimum tillage, and crop residue management help to conserve moisture. No-till planting, windbreaks, and crop rotations that include close growing crops also help to conserve soil and water. Fertilizers, particularly nitrogen, should be added in split applications. This soil is well suited to pasture forages such as coastal bermudagrass and bahiagrass.

The dominant native trees are loblolly pine, longleaf pine, red maple, hickory, sweetgum, black tupelo, southern red oak, white oak, and post oak. The understory is mainly dogwood, sassafras, American holly, and sourwood. The available water capacity is the main limitation to woodland management.

This soil is suited to most urban uses. The thick sandy materials provide a good support base for most structures. However, the unprotected sandy surface is subject to soil blowing and is droughty when rainfall is limited. The soil is poorly suited to recreational uses because of the sandy surface layer.

This Valhalla soil is in capability subclass IIs and in woodland group 3s.

WaA—Wahee fine sandy loam, 0 to 2 percent slopes. This somewhat poorly drained soil is on low ridges near the small streams that flow into the Chowan River, Perquimans River, and Albemarle Sound. Most of the acreage of this map unit is in cultivated crops. The

rest is mainly in woodland. The mapped areas are irregular in shape and range from 5 to 40 acres.

Typically, the surface layer is grayish brown fine sandy loam 6 inches thick. The subsoil is 34 inches thick. It is yellowish brown clay in the upper part, light brownish gray clay loam and gray clay in the middle part, and light gray sandy clay loam in the lower part. The underlying material to a depth of 65 inches is mottled light gray and brownish yellow sandy loam.

Permeability is slow, and shrink-swell potential is moderate. The soil is very strongly acid or strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is 0.5 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Altavista, Dogue, Augusta, and Roanoke soils. Augusta soils are near the outer edge of delineations. Altavista and Dogue soils are on slightly higher ridges than the Wahee soil. Roanoke soils are in depressions. The included soils make up about 10 percent of the map unit.

This Wahee soil is well suited to most local crops. Corn and soybeans are the dominant crops. Wetness is the main limitation to use for crops. Minimum tillage, cover crops, and the inclusion of grasses and legumes help to maintain tilth. Spring tillage and fall harvest can be delayed because of wetness. Slow permeability is a limitation to the installation of drainage systems. The soil is well suited to pasture forages, such as fescue and Ladino clover.

The dominant native trees are pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, black tupelo, elm, river birch, American sycamore, water oak, and willow oak. The understory is mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation to woodland management.

This soil is poorly suited to most urban and recreational uses. Wetness and slow permeability are the main limitations. Low strength is a limitation to local roads and streets.

This Wahee soil is in capability subclass IIw and in woodland group 2w.

WnB—Wando fine sand, 0 to 5 percent slopes. This excessively drained soil is most common in the western part of Chowan County. It is on low, broad ridges commonly adjacent to the Chowan River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and range from 10 to 500 acres.

Typically, the surface layer is dark grayish brown fine sand 10 inches thick. The underlying material to a depth of 82 inches is fine sand. It is yellowish brown in the upper part, brownish yellow in the middle part, and yellow in the lower part.

Permeability is rapid, and the available water capacity is low. The soil ranges from medium acid to neutral.

Included with this soil in mapping are Bojac, Seabrook, and Conetoe soils. Most of the included soils are near the outer edges of delineations. Seabrook soils are in small depressions. The included soils make up about 10 to 15 percent of the map unit.

This Wando soil is suited to a few crops, such as peaches, peanuts, sweet potatoes, and soybeans. It does not have sufficient moisture for most crops during the growing season. Leaching of plant nutrients, the hazard of soil blowing, and the low available water capacity are the main limitations to use for crops. Blowing sand can damage young plants. Minimum tillage, crop residue management, windbreaks, and the inclusion of close growing grasses and legumes help to control soil blowing and conserve moisture. Fertilizers, particularly nitrogen, should be added in split applications. This soil is suited to pasture forages, such as coastal bermudagrass and bahiagrass.

The dominant native trees are loblolly pine, longleaf pine, sweetgum, southern red oak, blackjack oak, white oak, post oak, and red maple. The understory is mainly dogwood, sassafras, and American holly. The low available water capacity is the main limitation to woodland management.

This soil is well suited to most urban uses. The thick sandy materials provide a good support base for most structures. However, the unprotected sandy surface is subject to soil blowing and is droughty when rainfall is limited. Seepage from septic tank filter field lines is also a problem. This soil is suited to recreational uses. However, the sandy surface layer is a limitation to some uses.

This Wando soil is in capability subclass IIIs and in woodland group 3s.

YeA—Yeopim loam, 0 to 2 percent slopes. This moderately well drained soil is near the small streams that flow into the Albemarle Sound and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. The mapped areas are irregular in shape and commonly are about 50 acres.

Typically, the surface layer is grayish brown loam 8 inches thick. The subsoil is 34 inches thick. It is yellowish brown loam in the upper part and yellowish brown clay loam in the lower part. The underlying material to a depth of 62 inches is loamy sand. It is light gray in the upper part and yellowish brown in the lower part.

Permeability is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is at a depth of about 1.5 to 3 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Dogue, Chapanoke, and Altavista soils. Chapanoke soils

are in small depressions. Most of the other included soils are near the outer edge of delineations. The included soils make up about 10 percent of the map unit.

This Yeopim soil is well suited to most local crops. Corn, peanuts, cotton, tobacco, and soybeans are the dominant crops. Seasonal wetness is a limitation for some specialty crops, such as peanuts and tobacco. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth. No-till planting, field borders, and rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory is mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation to woodland management.

This soil is suited to or poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Yeopim soil is in capability subclass IIw and in woodland group 2w.

YeB—Yeopim loam, 2 to 6 percent slopes. This moderately well drained soil is on slightly rounded ridges near the small streams that flow into the Albemarle Sound and Perquimans River. Most of the acreage of this map unit is in cultivated crops. The rest is mainly in woodland. Most of the mapped areas are oblong and irregular in width. They commonly range from 5 to 50 acres.

Typically, the surface layer is grayish brown loam 8 inches thick. The subsoil, to a depth of 42 inches, is yellowish brown loam in the upper part and yellowish brown clay loam in the lower part. The underlying material to a depth of 62 inches is loamy sand. It is light gray in the upper part and yellowish brown in the lower part.

Permeability is moderate, and the available water capacity is moderate. The soil ranges from extremely acid to strongly acid throughout, except in areas where the surface layer has been limed. The seasonal high water table is at a depth of about 1.5 to 3 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Dogue, Chapanoke, and Altavista soils. Most of the included soils are near the outer edge of delineations. The included soils make up about 10 to 15 percent of the map unit.

This Yeopim soil is well suited to most local crops. Corn, peanuts, cotton, tobacco, and soybeans are the dominant crops. Seasonal wetness is a limitation for some specialty crops, such as peanuts and tobacco. Runoff and the hazard of erosion are also limitations to use for crops. Winter cover crops, minimum tillage, and crop residue management help to maintain tilth (fig. 10). No-till planting, field borders, and rotations that include close growing crops help to conserve soil and water. This soil is well suited to pasture forages.

The dominant native trees are black tupelo, elm, yellow-poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory is mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras. Wetness is the main limitation to woodland management.

This soil is suited to or poorly suited to most urban and recreational uses. Wetness is the main limitation.

This Yeopim soil is in capability subclass IIe and in woodland group 2w.

Figure 10.—Minimum-till corn on Yeopim loam, 2 to 6 percent slopes.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Foy D. Hendrix, conservation agronomist, and Tony R. Short, district conservationist, Soil Conservation Service helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

According to the 1978 Census of Agriculture *(9)*, there was 40,600 acres of cropland and 2,400 acres of pasture in Chowan County and a total of 64,220 acres of cropland and 280 acres of pasture in Perquimans County. The major crops are corn, soybeans, peanuts, cotton, tobacco, small grains, and a variety of truck crops. Truck crops are more widely grown in Chowan County on the sandy soils along the Chowan River and county line road area.

Many of the soils are well suited to vegetable crops. The latest information and suggestions for growing specialty crops can be obtained from local offices of the Soil Conservation Service and the North Carolina Agricultural Extention Service.

Tall fescue and tall fescue with white clover are the primary grass and legume for grazing. Annual rye (grain) is also used for additional forage. The acreage used for pasture has slowly decreased over the past 20 years.

Corn and soybeans are the crops most commonly grown on the poorly drained soils, such as Roanoke, Perquimans, Tomotley, and Nimmo soils. Drainage is required for optimum crop production on these soils. The drainage system consists of a primary system of canals, a secondary system of field ditches, and surface shaping and leveling for farmland. Field ditches are generally 200 to 300 feet apart for farming.

The soils suitable for farming can be divided into two major groups, those with a light colored surface and those with a black surface. The soils that have a light colored surface have lower organic matter content. The soils that have a black surface contain higher amounts of organic matter, and they are on the wet landscapes in the interior parts of both counties.

Light Colored Soils. Early farming was on soils along the sounds and rivers because of the easy access. Today, many of these soils are still used to produce crops. The light colored surface ranges from very dark grayish brown to light brownish gray to brown. These soils consist of two groups—sandy and loamy soils and

clayey soils. Large acreages of the clayey soils are in the southern part of Chowan and Perquimans Counties in the Yeopim, Drummond Point, Greenfield, New Hope, Harveys Point, Woodville, and Durants Neck sections. The loamy and sandy soils are in the western and northern parts of Chowan County and in the central and northwestern parts of Perquimans County.

The well drained and moderately well drained, nearly level to gently sloping State, Bojac, Conetoe, Cainhoy, Dogue, Wando, Munden, Altavista, Yeopim, Tomahawk, Seabrook, and Echaw soils are used for growing tobacco, peanuts, cotton, and a wide variety of truck crops. The somewhat poorly drained Augusta, Dragston, Chapanoke, and Wahee soils are used for peanuts, cotton, and truck crops. The truck crops include watermelons, sweet corn, cantaloupe, sweet potatoes, cucumbers, tomatoes, and a small acreage of butter beans and snap beans. Artificial drainage may be needed on Munden, Altavista, Yeopim, Tomahawk, Seabrook, Dragston, Chapanoke, and Wahee soils for maximum production.

Soil erosion is a potential problem on the light colored surface soils. Erosion is costly for various reasons. Productivity and soil tilth are decreased when the surface layer is washed away. Herbicides, fertilizers, and lime are carried out of the field along with valuable topsoil and organic matter if erosion is left unchecked. In addition to being costly, there are social and environmental consequences if this eroded soil is deposited into streams, rivers, and sounds. Effective agricultural control of erosion increases productivity and minimizes the public cost of maintaining water quality standards.

Erosion control practices provide a protective surface cover, reduce runoff, and increase infiltration. Conservation practices common to these soils are field borders; winter cover crops; conservation tillage including minimum tillage, reduced till, and no-till; and crop residue management.

Wind erosion is often a problem on Conetoe, Bojac, Cainhoy, Seabrook, Echaw, and Wando soils. These soils have a sandy surface layer. Damage from wind erosion can be greatly reduced with conservation cropping systems including cover crops, crop residue management, and conservation tillage. Windbreaks of tall growing small grain are often used in row crop patterns to reduce wind damage to young plants.

Information about the design and applicability of erosion control practices for these soils can be obtained from the local office of the Soil Conservation Service.

Black Surface Soils. The black surface soils include both mineral and organic soils. The very poorly drained mineral soils are Portsmouth, Icaria, Arapahoe, and Cape Fear soils, and the organic soils are Scuppernong and Dorovan soils.

The mineral soils in this group were generally the first to be used for farming. Crops normally consisted of corn, soybeans, and small grains. Most of the remaining soil areas were unimproved and remained as cutover forest or savannah type swamp until the 1970's. Modern machinery, new technology, and a general increase in land values made it practical to develop these areas for farming. The exception is Dorovan soils, which are in wet, wooded swamps.

Practices applicable to the farming of black surface soils are described in the following paragraphs. Before undertaking any of these practices, an onsite evaluation should be made to determine if the practice is ecologically desirable.

Field drains. The black surface soils require extensive drainage to provide at least a minimum of aerated soil for plant roots to grow and function. Such drainage requires a primary system of canals, a secondary system of field ditches, and surface shaping and leveling for farmland (fig. 11). Field ditches can be 0.5 mile long or longer and 200 to 300 feet apart for farming.

Since most of these soils, mineral and organic alike, have very poor internal drainage, much of the excess water removal is by surface drainage. A workable surface drainage system includes sloping surfaces from the ditch upward toward the center of the field, not exceeding 0.5 percent slope. Fields are leveled to remove depressional areas that collect excess water. Canals for adequate water removal generally require a minimum drop of about 0.5 foot per mile.

The rate of water flow in the black surface soils is generally slow because of the low elevation and gentle relief. The slow flow rates allow most of the sand and silt size materials that may wash or erode from the land to settle in ditches and canals. Because of this, the ditches and canals require frequent sediment cleanout.

Erosion control. Black surface soils are subject to erosion by surface runoff from high intensity rains even on fields that are relatively flat. Most of this erosion occurs around "hoedrains" or cross drains that are used across fields from ditch to ditch. The bulk of the eroded soil settles in field ditches and canals, closing outlets and causing more frequent and costly cleanouts. Erosion can be reduced by field shaping and leveling to reduce the number of cross drains, by conservation tillage, by leaving crop residue on the surface, and by establishing plant cover ditch and canal banks.

Wind erosion can occur on black surface soils if they are bare, if the surface is not rough, and if the surface layer is dry. Soils that are high in organic matter content and have a loose, very friable surface layer have a tendency to blow. Wind erosion can partially fill ditches and canals, thereby reducing their effectiveness for drainage. The most effective control for wind erosion on cropland is to leave crop residue on the surface and to use bedding on the land. Planting a winter cover crop, such as rye, is effective in preventing wind erosion late in fall and early in spring.

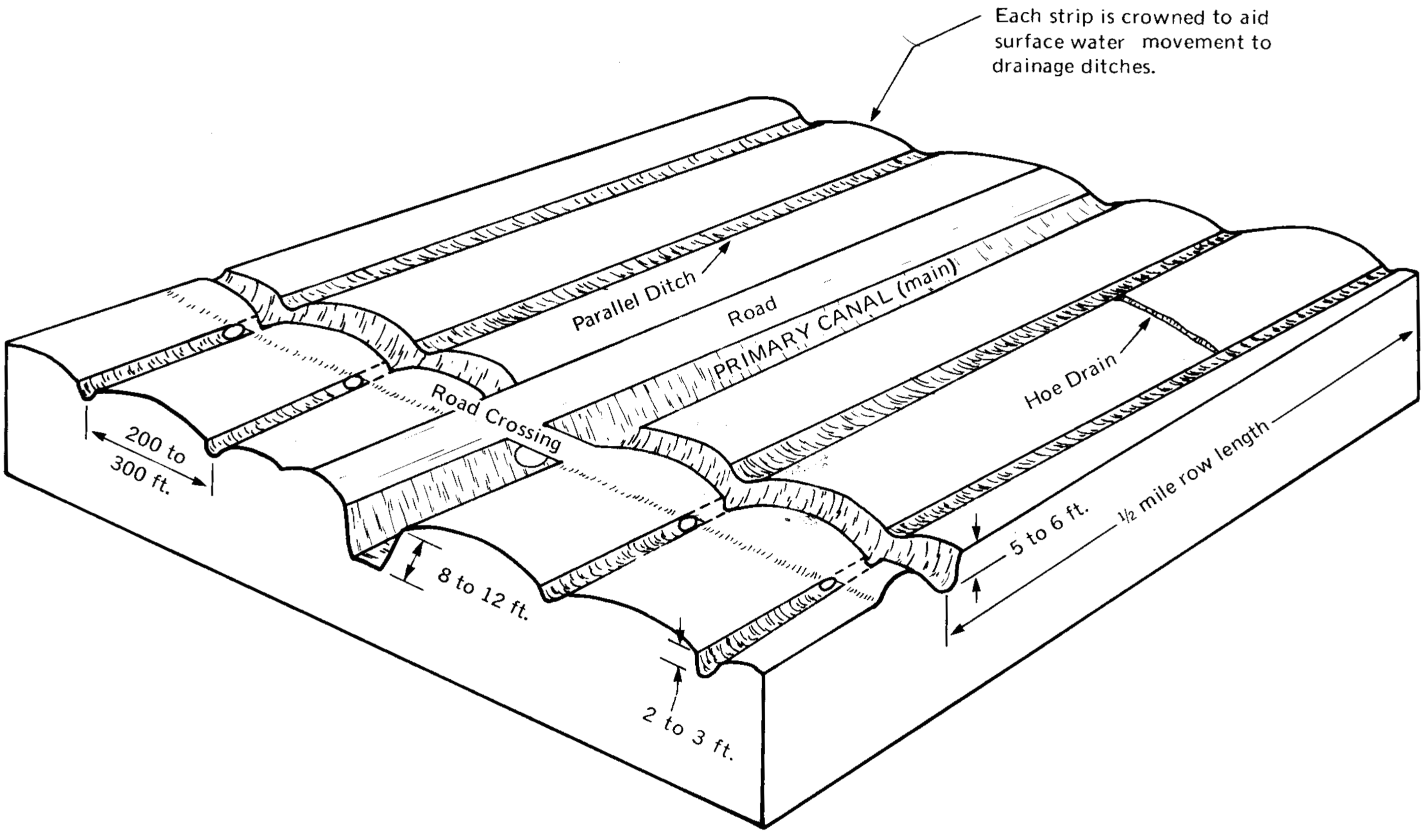


Figure 11.—Drainage system commonly used on black surface soils in Chowan and Perquimans Counties.

Windbreaks can be used to control wind erosion. To be effective, they need to be at right angles to the wind. The area of effective control is ten times the height of the break. Windbreaks provide good wildlife habitat and add to the aesthetic value of large, cleared areas.

Frost damage. Organic soils are cold natured because of their high moisture content and the insulating effect of their high content of organic matter. This results in these soils receiving frost a few days later in the spring and a few days earlier in the fall than mineral soils in the same area. Planting dates on the organic soils should be adjusted to avoid potential frost damage. Early maturing varieties of soybeans should be used for late plantings to avoid potential damage by early frosts in the fall. The growth rate for corn seedlings is slow in the spring because of cool soil temperature. Seedling growth is greatly increased if banded fertilizer containing ammonium nitrogen and phosphorus is used. This contributes significantly to establishing strong, fast growing stands even in cold, wet springs.

Liming the Soil. All of the black surface soils have a high lime requirement because of their high content of organic matter. In their natural state, they are extremely acid. Lime should be applied according to information from soil tests. These soils should be first limed to a depth of 5 or 6 inches. Each ton of dry agricultural lime increases soil pH levels from 0.1 to 0.3 pH units. To obtain the desired pH level of 5.0 on organic soils, 5 to 7 tons per acre are initially required. The desired pH level of high organic mineral soils is 5.3 to 5.5, and the initial lime requirement is 4 or 5 tons per acre. To maintain these pH levels, the lime requirement generally is 1 ton per acre every 2 to 3 years. Because many of these soils have adequate levels of magnesium, calcitic sources of lime are suitable. However, if soil tests indicate a lower magnesium level than is desirable, a dolomitic source of lime should be used.

Plant Nutrient Levels

In their natural state, these soils generally have a low level of available plant nutrients. However, they do respond to and retain fertilizer nutrients. Available phosphorus is generally very low, and extra fertilization is

required for the first year of cultivation. After the first year, only phosphorus indicated by soil tests is required.

Potassium is generally low for the first year, but not as low as phosphorous. The content of organic matter and clay in these soils enables them to retain potassium, thereby making it possible to attain good levels of this nutrient.

Nitrogen is a constituent of the organic matter, and some nitrogen is available for plant growth through the decomposition of the organic matter. However, when these soils become saturated at times of heavy rainfall, significant amounts of nitrogen are lost through denitrification. As a result, the amount of nitrogen required by crops on these soils is not significantly different from that required on mineral soils that have a light colored surface layer.

Most organic soils have deficiencies of micronutrients. In Chowan and Perquimans Counties, copper is the only micronutrient that is regularly deficient. When soils are initially cultivated, an application of 2.5 to 4 pounds of elemental copper per acre is recommended. This application is adequate for approximately 3 years, and subsequent applications should be made according to soils tests. Deficiencies in zinc and manganese can occur where areas are overlimed. Once the soils are cultivated, lime and fertilizer should be applied according to soil test analyses.

Chemical Weed Control

The use of herbicides for weed control in crops is a common practice in Chowan and Perquimans Counties. Successful use results in less tillage and is an integral part of modern farming. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates for both of these properties were determined for the soils described in this report. Table 20 shows a general range of organic matter content. The surface texture is shown in table 19 in the USDA texture column.

In some cases, the organic matter content projected for a soil may range outside that shown in the table. Higher ranges can occur in soil areas that have received high amounts of animal or manmade waste. New soil areas currently being brought into cultivation can have higher levels of organic matter content in their surface layer than soil areas that have been in cultivation for a long period of time. Conservation tillage can also increase organic matter content in the surface layer. Lower levels of organic matter are common in soil areas where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Other activities can affect organic matter content. Current soil tests should be used for specific organic matter determinations.

Rapid leaching of herbicides may damage young plants or prevent normal seed germination in sandy soils that have less than 2 percent organic matter. The effectiveness of herbicides commonly decreases if the organic matter level exceeds 6 to 10 percent.

For specific herbicide rates based on organic matter content and surface texture, read the label.

Yields Per Acre

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. Nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds of nitrogen per acre. Where the yield potential is only 100 bushels per acre, then rates of 100 to 120 pounds per acre should be used. Application of nitrogen in excess of potential yields is not generally a sound practice. Where corn or cotton follow harvested soybeans or peanuts, nitrogen rates can be reduced 20 to 30 pounds per acre.

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 8. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 8 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the North Carolina Agricultural Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow or droughty.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w* or *s*.

The acreage of soils in each capability class and subclass is shown in table 9. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Edwin J. Young, forester, Soil Conservation Service, helped prepare this section.

Forest lands are of significant economic, social, recreational, and environmental importance to Chowan and Perquimans Counties. Wooded areas have esthetic value and provide habitat for wildlife.

Commerical forests cover 144,771 acres, or 54 percent of the land area. Continuing urban encroachment, clearing for cropland, and other factors continue to reduce the commercial forest acreage. Commercial forest land is land capable of producing crops of industrial wood and not withdrawn from timber utilization.

Changes in forest type indicate hardwoods are replacing pines on a significant acreage. The current rate of pine planting and pine regeneration is less than the acreage of mature pine stands now being harvested. When pine stands are cut, understory hardwoods become dominant and take over the site. Vigorous methods of hardwood control, such as prescribed fire or mechanical site preparation, are often used to reestablish pine at the time of harvest cutting. Loblolly pine is the most important timber species in the counties, is adapted to the soil and climate, brings the highest average sale value per acre, and is relatively easy to establish and manage. It grows on a wide variety of soils.

For the purpose of forest survey, four forest type groups are identified in the county *(6)*.

- *Loblolly-Shortleaf pine* (40,970 acres).—This group is made up of more than 50 percent pine species, including pond pine and red and white oaks, gum, hickory, and yellow-poplar.
- *Oak-Pine* (23,162 acres).—In this group, hardwoods make up more than 50 percent of the stand and pines make up 25-50 percent. Common associates are upland oaks, gum, hickory, and yellow-poplar. If left undisturbed, this timber type will develop into a forest of predominantly oak and other upland hardwoods. The understory generally consists of hardwood seedlings and saplings which, because they are more tolerant of shade than pine, compete so strongly in shaded understory for light and moisture that few pine seedlings can survive. When mature stands of pine are cut, the dense understory of young hardwoods becomes dominant.

- *Oak-Hickory* (52,141 acres).—In this group, oaks and hickory make up more than 50 percent of the stand. Common associates include elm, maple, and yellow-poplar.
- *Oak-Gum-Cypress* (28,498 acres).—This forest group is bottom land forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress make up a majority of the stand. Where pines comprise 25 to 50 percent, the stand would be classified oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Site index is a measure of soil productivity and its capability to produce tree growth. Loblolly pine is used as the key indicator species for determining site index for most soils in the two counties except on sites more suitable for hardwoods. Site index ranges assigned to each ordination potential productivity class are shown on table 10. Yield tables for various trees species show the potential growth or yield by site index classes. For example, table 11 shows the potential loblolly pine yearly growth or yield per acre in Board Feet International 1/8-inch Rule by site index classes *(8)*. It shows the range of timber growth or yield as it relates to soil productivity.

Table 12 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, c, and s.

In table 12, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in a well-managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

In table 13, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 13, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by other information in this survey, for example,

interpretations for septic tank absorption fields in table 16 and interpretations for dwellings without basements and for local roads and streets in table 15.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, are not subject to flooding more than once a year during the period of use, and they have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, are not subject to prolonged flooding during the period of use, and they have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Chowan and Perquimans Counties contain an abundance of excellent wildlife and fisheries habitat. The habitat is an excellent mix of agricultural land, woodland, stream courses, and riparian wetlands. Wildlife species reflect this habitat diversity with an abundance of deer, rabbits, squirrels, quail, doves, ducks, and geese throughout the area.

Important soils on uplands for wildlife habitat are the Altavista, Augusta, Bojac, Chapanoke, Conetoe, Dogue, Dragston, Munden, State, Tomahawk, Valhalla, Wahee, and Yeopim soils. Agricultural production on these soils is good. The primary crops are soybeans, cotton, peanuts, and corn. Such wildlife as quail, rabbits, and doves readily adapt to this land use if all their habitat requirements are present. Also, deer have readily adapted to these agricultural land uses, and their populations in the farmed areas are moderate to high where farmland is interspersed with woodland. An abundance of "edge" in the two counties also favors most resident wildlife species.

Wetlands in Chowan and Perquimans Counties are primarily wooded swamps (type 7) and bog areas (type 8) *(10)*. The dominant trees in the wooded swamps are the baldcypress, water tupelo, gum, swamp blackgum, and willow oak. The Chowan and Dorovan soils are in the wooded swamp areas.

Dominant in the bog areas are the pond pine, spagnum moss, titi, redbay, sweetbay, and gallberry. The Arapahoe, Cape Fear, Dorovan, Lynn Haven, Portsmouth, and Scuppernong soils are in these areas. Many of these soils have been drained, cleared, and converted to agriculture in the past few years. This trend is continuing, but not at a rate comparable to some of the surrounding counties.

Roanoke soil is normally considered as a Type 1 wetland. However, as it is mapped in these counties, this soil does not support a vegetative community typical of a Type 1 wetland. This is because many areas have been cleared and are now farmed or planted to pines. Enough drainage has been done throughout the area of occurrence of Roanoke soils to lower the water table below its normal level.

In table 14, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are oak, hickory, dogwood, Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay

minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 15 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by soil texture and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 16 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 16 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are

unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent and surfacing of effluent, can affect public health. Ground water can be polluted if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 16 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 16 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 17 gives information about the soils as a source of roadfill, sand, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of

excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand. They have at least 5 feet of suitable material and low shrink-swell potential. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 and a high shrink-swell potential. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand is a natural aggregate suitable for commercial use with a minimum of processing. Sand is used in many kinds of construction. Specifications for each use vary widely. In table 17, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil) and the thickness of suitable material. Acidity and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, or soils that have only 20 to 40 inches of suitable material. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 18 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for embankments, dikes, and levees and for aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement,

permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 22.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 19 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 22.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

Physical and Chemical Properties

Table 20 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 20, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 21 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse

texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 21 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 21 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 21.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 22 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), Mechanical analysis—T 88 (AASHTO),

Plasticity index—T 90 (AASHTO), Moisture density, and Method A—T 99 (AASHTO).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(7)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 23 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquults (*Aqu*, meaning water, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Ochraquults (*Ochr*, meaning presence of ochric epipedon, plus *aquults*, the suborder of the Ultisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Ochraquults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Typic Ochraquults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described (fig. 12). The detailed description of each soil horizon follows standards in the *Soil Survey Manual (5)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (7)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

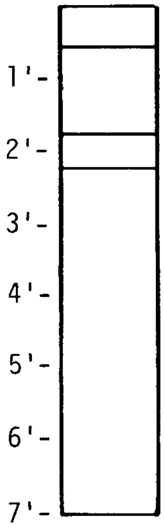
Altavista Series

The Altavista series consists of moderately well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Altavista fine sandy loam, 0 to 2 percent slopes; approximately 0.8 mile northwest of the intersection of North Carolina Highway 32 and State Road 1103, 50 feet northeast of State Road 1103:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very

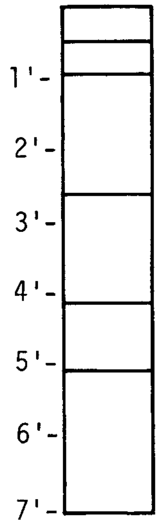
Profile of Chowan Series



A1	0-6"	Dark grayish brown silt loam
Cg1	6-20"	Gray silty clay loam
Cg2	20-27"	Dark grayish brown silt loam
2Oa	27-80"	Black muck

Main use: Woodland
Limitations: Flooding

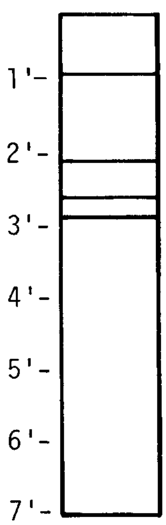
Profile of Chapanoke Series



Ap	0-6"	Grayish brown silt loam
Bt1	6-12"	Olive yellow loam
Btg1	12-30"	Light gray silty clay loam
Btg2	30-50"	Gray silt loam
BC	50-62"	Gray loamy fine sand
C	62-80"	Yellowish brown fine sand

Main use: Corn, Soybeans
Limitations: Wetness

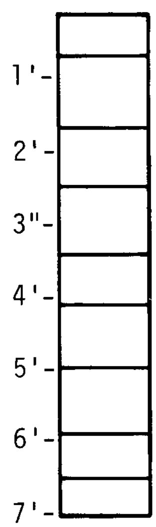
Profile of Icaria Series



Ap	0-11"	Black fine sandy loam
Btg	11-25"	Grayish brown sandy clay loam
2Eb	25-29"	Brown loamy sand
2Bhb1	29-34"	Very dark gray sand
2Bhb2	34-62"	Dark brown sand

Main use: Corn, Soybeans
Limitations: Wetness

Profile of Valhalla Series



Ap	0-10"	Brown fine sand
E	10-21"	Yellow fine sand
Bt1	21-30"	Strong brown fine sandy loam
Bt2	30-40"	Yellowish brown loamy fine sand
2Eb1	40-50"	Yellow fine sand
2Eb2	50-60"	Very pale brown fine sand
2Bhb	60-70"	Very dark grayish brown fine sand
2E'b	70-75"	Light gray fine sand
2B'hb	75-99"	Black fine sand

Main use: Peanuts, Cotton
Limitations: Droughty, leaching

Figure 12.—Soil properties, major uses, and limitations of four contrasting soils in Chowan and Perquimans Counties.

friable; many fine roots; slightly acid; abrupt smooth boundary.

E—6 to 10 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; friable; few fine and medium roots; slightly acid; clear smooth boundary.

Bt1—10 to 18 inches; light yellowish brown (10 YR 6/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; few medium roots; medium acid; clear smooth boundary.

Bt2—18 to 24 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—24 to 40 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium and distinct light gray (10YR 7/2) mottles and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt4—40 to 50 inches; brownish yellow (10YR 6/8) sandy loam that has pockets of loamy sand; few fine prominent yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

C1—50 to 60 inches; brownish yellow (10YR 6/6) sandy loam; massive; friable; strongly acid; clear smooth boundary.

C2—60 to 72 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine distinct light gray (10YR 7/2) mottles and few fine prominent yellowish red (5YR 5/8) mottles; massive; friable, slightly sticky and slightly plastic; strongly acid.

The Altavista soils have loamy horizons 35 to 70 inches thick. The soil ranges from very strongly acid to medium acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. In some pedons, the lower part of the Bt horizon has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Bt horizon is commonly sandy clay loam or clay loam, but can have thin layers of fine sandy loam, sandy loam, loam, or loamy sand.

The C horizon is sandy or loamy material, but some pedons have thin strata of clay.

Arapahoe Series

The Arapahoe series consists of very poorly drained soils that formed in loamy fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Arapahoe fine sandy loam; approximately 3 miles north of Hertford, 1.7 miles northeast of the intersection of State Roads 1214 and 1223, 100 feet southeast of State Road 1223, in a cultivated field:

Ap—0 to 10 inches; black (10YR 2/1) fine sandy loam; moderate fine granular structure; very friable; very strongly acid; clear smooth boundary.

A—10 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam; common medium faint pale brown (10YR 6/3) mottles and few fine faint grayish brown mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual smooth boundary.

Bg—14 to 25 inches; light brownish gray (10YR 6/2) fine sandy loam; many medium faint brown (10YR 5/3) mottles and common medium faint light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable; extremely acid; clear smooth boundary.

Cg1—25 to 30 inches; light gray (10YR 7/2) fine sand; single grained; loose; medium acid; clear smooth boundary.

Cg2—30 to 42 inches; light gray (10YR 7/1) loamy sand; common medium faint brownish yellow (10YR 6/6) mottles and few fine faint light brownish gray mottles; single grained; loose; strongly acid; clear smooth boundary.

Cg3—42 to 60 inches; light gray (2.5Y 7/2) sand, few fine faint olive yellow mottles; single grained; loose; strongly acid.

The Arapahoe soils have loamy horizons 25 to 35 inches thick. The soil ranges from strongly acid to extremely acid in the A and B horizon, except where the surface layer has been limed. The C horizon ranges from strongly acid to mildly alkaline.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of brown, gray, or yellow are in some pedons. The B horizon is fine sandy loam, loam, or sandy loam. Thin strata of sandy clay or sandy clay loam are in some pedons.

The C horizon has hue of 10YR to 5G, value of 4 to 7, and chroma of 1 or 2. It is sandy loam, loamy sand, fine sand, or sand. Some pedons contain thin layers and pockets of fine textures.

Augusta Series

The Augusta series consists of somewhat poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Augusta fine sandy loam; approximately 0.7 mile north of the intersection of North Carolina Highway 32 and State Road 1316, 100 feet east of State Road 1316:

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

Bt—8 to 12 inches; pale brown (10YR 6/3) fine sandy loam; few fine faint light brownish gray mottles and many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; few fine and medium roots; slightly acid; clear smooth boundary.

Btg1—12 to 48 inches; light brownish gray (10YR 6/2) sandy clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—48 to 56 inches; light gray (10YR 7/1) sandy loam; few coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

C—56 to 64 inches; yellowish brown (10YR 5/6) sandy loam; many coarse distinct light brownish gray (10YR 6/2) mottles; massive; friable; strongly acid.

The Augusta soils have loamy horizons 40 to 70 inches thick. The soil ranges from the very strongly acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4.

The E horizon, where present, has hue of 10YR to 5Y, value of 6 or 7, and chroma of 2 or 4.

The Bt horizon has hue of 10YR to 2.5Y, value of 5 or 7, and chroma of 3 or 4. In some pedons, this horizon has a few olive yellow, light brownish gray, or yellowish brown mottles.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The Bt and Btg horizons are commonly sandy clay loam or clay loam, but can have thin layers of fine sandy loam, sandy loam, or loamy sand.

The C horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 to 6, or it is neutral and has value of 5 to 7. It is sand, loamy sand, or sandy loam.

Bojac Series

The Bojac series consists of well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 3 percent.

A typical pedon of Bojac loamy fine sand, 0 to 3 percent slopes; approximately 0.5 mile east of the intersection of State Road 1343 and U.S. Highway 17, 100 feet south of State Road 1343, in a cultivated field:

Ap—0 to 7 inches; brown (10YR 5/3) loamy fine sand; weak fine granular structure; very friable; few fine and medium roots; medium acid; clear smooth boundary.

E—7 to 13 inches; very pale brown (10YR 7/4) loamy fine sand; weak fine granular structure; very friable; few medium roots; common dark opaque minerals; strongly acid; clear wavy boundary.

Bt1—13 to 24 inches; brownish yellow (10YR 6/6) sandy loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; common dark opaque minerals; strongly acid; clear smooth boundary.

Bt2—24 to 35 inches; brownish yellow (10YR 6/6) loamy sand; few fine faint strong brown mottles; weak fine granular structure; friable; few faint clay films on faces of peds; common dark opaque minerals; strongly acid; clear smooth boundary.

C1—35 to 45 inches; pale yellow (2.5Y 7/4) sand; common medium distinct brownish yellow (10YR 6/6) mottles; single grained; loose; common dark opaque minerals; strongly acid; clear smooth boundary.

C2—45 to 72 inches; light yellowish brown (2.5Y 6/4) sand; common medium distinct reddish yellow (7.5YR 6/8) mottles; single grained; loose; common dark opaque minerals; strongly acid.

The Bojac soils have loamy and sandy horizons. The soil ranges from very strongly acid to slightly acid, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4.

The E horizon, where present, has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 3 to 6.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. The Bt horizon is typically sandy loam or loamy sand, but it can have thin layers of sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is sand or loamy sand.

Cainhoy Series

The Cainhoy series consists of somewhat excessively drained soils that formed in sandy fluvial and marine sediments. Slopes range from 0 to 6 percent.

A typical pedon of Cainhoy fine sand, 0 to 6 percent slopes; approximately 500 feet east of the intersection of State Roads 1002 and 1117, in a cultivated field:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) fine sand; weak medium granular structure; very friable; few fine roots; common dark minerals; medium acid; clear smooth boundary.

Bw1—10 to 26 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common dark minerals; medium acid; clear smooth boundary.

Bw2—26 to 36 inches; strong brown (7.5YR 5/6) fine sand; single grained; loose; common dark minerals; very strongly acid; clear smooth boundary.

Bw3—36 to 60 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common dark minerals; very strongly acid; clear smooth boundary.

Bw4—60 to 80 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common dark minerals; very strongly acid; clear smooth boundary.

E—80 to 90 inches; light gray (10YR 7/1) fine sand; single grained; loose; common dark minerals; strongly acid; clear smooth boundary.

Bh—90 to 99 inches; dark gray (5YR 4/1) fine sand; single grained; loose; strongly acid.

The Cainhoy soils have sandy horizons more than 80 inches thick. The soil ranges from very strongly acid to slightly acid, except where the surface layer has been limed. Depth to the upper boundary of the E or E' horizon ranges from 50 to 80 inches. Depth to the Bh horizon is more than 80 inches.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The Bw horizon has hue of 7.5YR to 10YR, value of 5 to 8, and chroma of 3 to 8. It is loamy fine sand or fine sand.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. It is fine sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 or 2. It is fine sand.

Cape Fear Series

The Cape Fear series consists of very poorly drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Cape Fear loam; approximately 1.7 miles north of the intersection of U.S. Business Highway 17 and State Road 1319, 100 feet west of State Road 1319:

A—0 to 11 inches; black (10YR 2/1) loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—11 to 17 inches; light brownish gray (10YR 6/2) loam; weak medium granular structure; friable; few fine and medium roots; very strongly acid; abrupt smooth boundary.

Btg1—17 to 38 inches; light brownish gray (10YR 6/2) clay; common medium distinct brownish yellow (10YR 6/8) mottles and common medium faint gray (10YR 5/1) mottles; medium subangular blocky structure; sticky and plastic; few medium roots; strongly acid; clear smooth boundary.

Btg2—38 to 43 inches; mottled gray (10YR 6/1), brownish yellow (10YR 6/8), and yellowish red (5YR 5/8) sandy clay loam; weak medium granular structure; friable, slightly sticky and slightly plastic; massive; few fine flakes of mica; strongly acid; clear smooth boundary.

BCg—43 to 52 inches; light gray (N 7/0) sandy loam; common medium distinct olive yellow (2.5Y 6/6) and yellowish brown (10YR 5/8) mottles and common medium faint gray (10YR 6/1) mottles; massive; friable; few fine flakes of mica; strongly acid; clear smooth boundary.

Cg—52 to 62 inches; gray (10YR 6/1) loamy sand; common medium distinct brownish yellow (10YR 6/8) mottles and few fine distinct strong brown (7.5YR 5/8) mottles; massive; friable; common fine flakes of mica; strongly acid.

The Cape Fear soils have clayey and loamy horizons 28 to 60 inches thick. The soil ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The E horizon, where present, has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2, or it is mottled. It is clay, sandy clay, clay loam, or sandy clay loam. In most pedons, this horizon contains few to common mottles of higher chroma.

The BCg and Cg horizons and, where present, the 2Cg horizon are light gray, gray, dark grayish brown, or grayish brown sand or loamy sand.

Chapanoke Series

The Chapanoke series consists of somewhat poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Chapanoke silt loam; approximately 0.4 mile east of the intersection of State Road 1226 and U.S. Highway 17, 100 feet north of U.S. Highway 17, in a cultivated field:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; few fine and medium roots; medium acid; clear smooth boundary.

Bt1—6 to 12 inches; olive yellow (2.5Y 6/6) loam; common medium distinct light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few fine roots; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; clear smooth boundary.

Btg1—12 to 30 inches; light gray (2.5Y 7/2) silty clay loam; common medium distinct brownish yellow (10YR 6/6) mottles and common fine faint grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.

Btg2—30 to 50 inches; gray (10YR 6/1) silt loam; common medium distinct brownish yellow (10YR 6/8) and pale yellow (2.5Y 7/4) mottles; weak fine subangular blocky structure; friable; common fine flakes of mica; strongly acid; gradual smooth boundary.

BC—50 to 62 inches; gray (10YR 6/1) loamy fine sand; common coarse distinct brownish yellow (10YR 6/6) mottles; single grained; loose; common fine flakes of mica; many fine dark opaque minerals; strongly acid; gradual smooth boundary.

C—62 to 80 inches; brownish yellow (10YR 6/6) fine sand; few fine distinct light brownish gray (10YR 6/2) mottles; single grained; loose; common fine flakes of mica; many fine dark opaque minerals; strongly acid.

The Chapanoke soils have horizons that are 40 to 60 inches thick. The soil ranges from extremely acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 2 to 6, or it is neutral and has value of 4 to 7.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 3. The E horizon is silt loam, loam, fine sandy loam, or very fine sandy loam.

The AB or BA horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. High and low chroma mottles are few to common. It is loam, silt loam, or very fine sandy loam.

The upper part of the Bt horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 8. Mottles of high chroma are present in most pedons. The lower part of the Bt horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral and has value of 4 to 7. Mottles of high chroma are present in most pedons. The Bt horizon is commonly loam, silty clay loam, or clay loam but can contain thin layers of silt loam, fine sandy loam, very fine sandy loam, or sandy loam.

The BC or CB horizon, where present, has colors similar to those of the lower part of the Bt horizon. It is silt loam, loam, loamy fine sand, fine sandy loam, very fine sandy loam, or sandy clay loam.

The C horizon has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 1 to 8, or it is neutral and has value of 4 to 7. It is sandy or loamy, but some pedons contain thin strata of clay.

Chowan Series

The Chowan series consists of very poorly drained soils that have surface mineral horizons over highly decomposed organic material. The soils are on flood plains along streams. Slopes range from 0 to 2 percent.

A typical pedon of Chowan silt loam; approximately 2 miles east of Edenton, 0.4 mile north of the intersection of State Road 1103 and North Carolina Highway 32, 150 feet west of State Road 1103, in a creek bottom:

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable, slightly sticky; common medium and coarse roots; medium acid; gradual wavy boundary.

Cg1—6 to 20 inches; gray (10YR 5/1) silty clay loam; massive; friable, sticky; common coarse roots; medium acid; gradual wavy boundary.

Cg2—20 to 27 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable, slightly sticky; few coarse roots; medium acid; gradual wavy boundary.

20a—27 to 80 inches; black (5YR 2/1) muck; about 30 percent fibers, less than 10 percent rubbed; massive; very friable; common logs and stumps; extremely acid.

The Chowan soils have mineral horizons 16 to 40 inches thick. The underlying organic horizon ranges to a depth of 80 inches or more. The soil ranges from extremely acid to medium acid in the mineral horizons and is extremely acid or very strongly acid in the organic horizon.

The A horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 or 2. In pedons that have a horizon with value of less than 3.5, the soil is less than 10 inches thick.

The C horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 or 2. It is loam, silt loam, silty clay loam, or mucky silt loam.

The 20a horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 3. It is sapric material 16 inches to several feet thick. Stumps and logs are common throughout the 0a horizon of most pedons.

Conetoe Series

The Conetoe series consists of well drained soils that formed in loamy fluvial and marine sediments. Slopes range from 0 to 5 percent.

A typical pedon of Conetoe loamy sand, 0 to 5 percent slopes; approximately 1 mile east of the intersection of U.S. Highway 17 and State Road 1201, 400 feet south of U.S. Highway 17, in a cultivated field:

Ap—0 to 7 inches; brown (10YR 4/3) loamy sand; weak medium granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

E—7 to 25 inches; brownish yellow (10YR 6/6) loamy fine sand; weak medium granular structure; very friable; few fine and medium roots; strongly acid; clear smooth boundary.

Bt1—25 to 31 inches; brownish yellow (10YR 6/6) sandy loam; weak medium granular structure; friable; sand grains are coated and bridged with clay; strongly acid; clear smooth boundary.

Bt2—31 to 46 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; sand grains are coated and bridged with clay; strongly acid; clear smooth boundary.

BC—46 to 60 inches; brownish yellow (10YR 6/8) loamy sand; weak medium granular structure; very friable; few sand grains are coated and bridged with clay; few to common dark minerals; very strongly acid; clear smooth boundary.

C—60 to 82 inches; brownish yellow (10YR 6/6) sand; weak medium granular structure; very friable; common grains of dark minerals; very strongly acid.

The Conetoe soils have loamy Bt horizons 20 to 40 inches thick. The soil ranges from very strongly acid to medium acid throughout, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 5 to 8. It is sandy loam or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 5 to 8. It is typically loamy sand, but in some pedons, this horizon has thin layers of sand.

The C horizon has hue of 7.5YR to 10YR, value of 6 or 7, and chroma of 3 to 8. It is loamy sand or sand.

Dogue Series

The Dogue series consists of moderately well drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 6 percent.

A typical pedon of Dogue fine sandy loam, 0 to 2 percent slope; approximately 0.4 mile west of the intersection of State Road 1208 and North Carolina Highway 32, 100 feet south of State Road 1208, in a cultivated field:

Ap—0 to 8 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—8 to 19 inches; brownish yellow (10YR 6/6) sandy clay loam; few common faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—19 to 26 inches; brownish yellow (10YR 6/6) clay; few fine distinct yellowish red (5YR 5/8) mottles and few fine faint light gray mottles; moderate fine subangular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—26 to 42 inches; yellowish brown (10YR 5/4) clay; common medium distinct red (2.5Y 4/6) and light gray (10YR 7/1) mottles; massive; firm, sticky and plastic; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt4—42 to 50 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/4), and yellowish red (5YR 4/8) clay; massive; firm, sticky and plastic; few distinct clay films on faces of peds; few pockets of sandy clay loam; very strongly acid; clear smooth boundary.

Bt5—50 to 66 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles and common medium faint gray (10YR 6/1) mottles; massive; friable, slightly sticky and slightly plastic; common pockets of sandy loam; very strongly acid; clear smooth boundary.

C—66 to 72 inches; yellowish brown (10YR 5/6) sandy loam; common fine distinct gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; massive; friable; few pockets of sandy clay loam; extremely acid.

The Dogue soils have clayey Bt horizons 30 to 50 inches thick. The soil ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

The E horizon, if present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 or 6.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 4 to 8. The lower part of the Bt horizon is mottled in shades of gray, red, yellow, or brown. In some pedons, this horizon is mottled without dominant matrix color. The Bt horizon is typically clay or clay loam,

but can have thin layers of sandy clay, sandy clay loam, or sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. It is loamy sand, sand, sandy loam, or sandy clay loam.

Dorovan Series

The Dorovan series consists of very poorly drained organic soils. The organic layers are more than 51 inches thick over unconsolidated fluvial sediment. Slopes are less than 1 percent.

A typical pedon of Dorovan muck; approximately 0.5 mile west of the intersection of State Roads 1203 and 1204, 50 feet south of State Road 1203:

Oe—0 to 3 inches; very dark brown (10YR 2/2) muck consisting of slightly decomposed leaves, twigs, and roots; extremely acid; gradual wavy boundary.

Oa1—3 to 72 inches; black (10YR 2/1) muck; about 80 percent fiber unrubbed and 20 percent rubbed; massive; slightly sticky; common medium roots and partially decomposed limbs; extremely acid; diffuse wavy boundary.

Oa2—72 to 96 inches; black (10YR 2/1) muck; about 90 percent fiber unrubbed and 40 percent rubbed; common coarse and medium roots and partially decomposed limbs; massive; nonsticky; extremely acid.

The organic materials are 51 to more than 80 inches thick. This soil is extremely acid. Up to 5 percent logs and wood fragments are in the organic layers. Organic layers are underlain by sandy and loamy mineral soil.

Root mats and litter layers 6 to 12 inches thick commonly occur over the Oa1 horizon. The Oa1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is muck. Fiber content is 15 to 90 percent unrubbed and 10 to 40 percent rubbed. Mineral content ranges from 10 to 30 percent in the Oa1 horizon.

The Oa layers below the Oa1 horizon have hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2, or they are neutral and have value of 2 or 3. These layers are sapric material. Fiber content is 15 to 90 percent unrubbed and commonly 10 to 40 percent rubbed. Mineral content ranges from 5 to 20 percent.

The 2C horizon, if present, has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is stratified sandy or loamy fluvial deposits.

Dragston Series

The Dragston series consists of somewhat poorly drained soils that formed in loamy fluvial sediment. Slopes range from 0 to 2 percent.

A typical pedon of Dragston loamy fine sand; 0.4 mile southeast of the intersection of State Roads 1216 and 1215, 100 feet west of State Road 1216, in a cultivated field:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

E—7 to 10 inches; very pale brown (10YR 7/4) loamy fine sand; weak medium granular structure; very friable; few fine and medium roots; medium acid; abrupt smooth boundary.

Bt—10 to 20 inches; brownish yellow (10YR 6/6) sandy loam; common medium faint light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few common roots; strongly acid; clear smooth boundary.

Btg1—20 to 27 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—27 to 36 inches; mottled light gray (10YR 7/1), yellowish brown (10YR 5/8), and very pale brown (10YR 7/4) loamy sand; single grained; very friable; few faint clay bridgings of sand grains; strongly acid; clear smooth boundary.

Cg1—36 to 48 inches; white (10YR 8/1) sand; single grained; loose; strongly acid; clear smooth boundary.

Cg2—48 to 68 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

The Dragston soils have loamy horizons 15 to 30 inches thick. The soil is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 4.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4. It is loamy fine sand or loamy sand.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. The lower part of the Bt horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4, or it is mottled. The Bt horizon is typically sandy loam or fine sandy loam, but can have thin layers of loamy sand, loamy fine sand, or sandy clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 to 4. It is sand, loamy sand, or loamy fine sand. In some pedons, this horizon has thin lenses of sandy loam.

Echaw Series

The Echaw series consists of moderately well drained soils that formed in sandy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Echaw fine sand; approximately 0.2 mile east of the intersection of State Roads 1305 and 1308, 50 feet south of State Road 1308:

Ap—0 to 8 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear smooth boundary.

E1—8 to 16 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine and medium roots; common dark minerals; very strongly acid; clear smooth boundary.

E2—16 to 24 inches; very pale brown (10YR 7/3) fine sand; few fine faint white mottles and few fine distinct strong brown (7.5YR 5/8) mottles; single grained; loose; few medium roots; common dark minerals; medium acid; clear smooth boundary.

E3—24 to 36 inches; light gray (10YR 7/1) fine sand; single grained; loose; common dark minerals; medium acid; clear smooth boundary.

Bh—36 to 64 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; medium acid.

Echaw soils have sandy horizons more than 60 inches thick. Depth to the Bh horizon ranges from 30 to 50 inches. The soil ranges from very strongly acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The upper part of the E horizon has hue of 7.5YR to 10YR, value of 4 to 7, and chroma of 3 to 6. The lower part of the E horizon has the same matrix colors as the upper part of the E horizon and has gray mottles, or it has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. The E horizon is loamy fine sand, loamy sand, or fine sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 4. It is loamy sand, fine sand, sand, or loamy fine sand.

The C horizon, where present, is gray sand, fine sand, or loamy fine sand.

Icaria Series

The Icaria series consists of poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Icaria fine sandy loam; approximately 0.9 mile northwest of State Roads 1002 and 1305, 600 feet north of State Road 1305:

Ap—0 to 11 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; few fine medium roots; strongly acid; clear smooth boundary.

Btg—11 to 25 inches; grayish brown (10YR 5/2) sandy clay loam; weak medium subangular blocky structure; friable; few common roots; few faint clay films on faces of peds; strongly acid; clear wavy boundary.

2Eb—25 to 29 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

2Bhb1—29 to 34 inches; very dark gray (10YR 3/1) sand; massive; about 90 percent of sand grains are coated and bridged with organic matter; very strongly acid; clear wavy boundary.

2Bhb2—34 to 62 inches; dark brown (10YR 3/3) sand; massive; about 80 percent of sand grains are coated and bridged with organic matter; very strongly acid.

The upper sequum of Icaria soils, which includes the argillic horizon, ranges from 20 to 40 inches thick. The lower sequum consists of spodic horizons that commonly extend to a depth of more than 60 inches. In some pedons, spodic horizons are separated by thin albic horizons. The soil ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2, or it is neutral and has value of 2 or 3.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam.

The B1 horizon, where present, has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral and has value of 4 to 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral and has value of 4 to 7. Mottles of high chroma are in some pedons. The Bt horizon commonly is sandy clay loam, loam, or clay loam. Thin layers of sandy loam or fine sandy loam are in some pedons.

The 2Eb horizon, where present, has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 to 3. It is sand, fine sand, loamy fine sand, or loamy sand.

The 2Bhb horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. It is sand or fine sand.

Lynn Haven Series

The Lynn Haven series consists of very poorly drained soils that formed in sandy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Lynn Haven sand; approximately 1 mile north of Harris Landing, 1.2 miles north of the

intersection of State Roads 1214 and 1210, 50 feet east of State Road 1214:

Ap—0 to 10 inches; black (10YR 2/1) sand; weak medium granular structure; very friable; few fine roots; slightly acid; clear wavy boundary.
E—10 to 16 inches; gray (10YR 6/1) fine sand; weak fine granular structure; few fine roots; strongly acid; clear smooth boundary.
Bh1—16 to 30 inches; dark reddish brown (5YR 3/2) fine sand; massive; weakly cemented; sand grains coated with organic matter; extremely acid; gradual wavy boundary.
Bh2—30 to 36 inches; dark reddish brown (5YR 2/2) fine sand; massive; weakly cemented; sand grains coated with organic matter; extremely acid; gradual wavy boundary.
Bh3—36 to 64 inches; reddish brown (5YR 4/3) fine sand; massive; friable; extremely acid.

Lynn Haven soils have sandy horizons more than 60 inches thick. The soil ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1, or it is neutral and has value of 2 or 3.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral and has value of 0 to 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 4, and chroma of 1 to 4.

The C horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3.

Munden Series

The Munden series consists of moderately well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Munden loamy fine sand, 0 to 2 percent slopes; approximately 0.9 mile north of the intersection of State Roads 1316 and 1319, 100 feet east of State Road 1316, in a cultivated field:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; many fine and very fine roots; strongly acid; abrupt smooth boundary.
E—8 to 14 inches; pale yellow (2.5Y 7/4) loamy fine sand; weak medium granular structure; very friable; few medium roots; common dark opaque minerals; strongly acid; clear smooth boundary.
Bt1—14 to 28 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium faint brownish yellow (10YR 6/6) and very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common dark opaque minerals; medium acid; gradual smooth boundary.
Bt2—28 to 36 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium faint light yellowish brown (10YR 6/4) mottles and common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; few faint clay films on faces of peds; friable; common dark opaque minerals; medium acid; clear smooth boundary.
C1—36 to 44 inches; pale yellow (2.5Y 7/4) loamy fine sand; common medium distinct light gray (2.5Y 7/2) mottles; single grained; loose; common dark opaque minerals; medium acid; clear smooth boundary.
C2—44 to 52 inches; mottled light gray (2.5Y 7/2), white (10YR 8/1), and light olive brown (2.5Y 5/6) fine sandy loam; massive; very friable; common dark opaque minerals; medium acid, clear smooth boundary.
C3—52 to 62 inches; mottled yellowish brown (10YR 5/6) and white (10YR 8/1) fine sandy loam; very friable; common dark opaque minerals; medium acid.

The Munden soils have loamy Bt horizons 12 to 30 inches thick. The soil ranges from very strongly acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 6.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Few to common low chroma mottles commonly occur in the lower part of the Bt horizon. The Bt horizon is sandy loam or fine sandy loam. In some pedons, this horizon has thin layers of sandy clay loam, loamy sand, or loamy fine sand.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8, or it is neutral and has value of 5 to 8, or it is mottled in shades of red, yellow, brown, gray, or white. It is loamy sand, sandy loam, fine sandy loam, loamy fine sand, fine sand, or sand.

Nimmo Series

The Nimmo series consists of poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Nimmo loamy fine sand; approximately 0.9 mile north of the intersection of State Roads 1316 and 1319, 0.5 mile east of State Road 1319:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; few fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—6 to 18 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct light yellowish brown (2.5Y 6/4) mottles; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—18 to 25 inches; light brownish gray (10YR 6/2) fine sandy loam; weak fine subangular blocky structure; friable; many sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

Cg1—25 to 36 inches; light gray (10YR 7/1) sand; common medium distinct brownish yellow (10YR 6/8) mottles and common fine distinct strong brown (7.5YR 5/8) mottles; single grained; loose; common dark opaque minerals; strongly acid; gradual smooth boundary.

Cg2—36 to 48 inches; mottled white (10YR 8/1), brownish yellow (10YR 6/8), and strong brown (7.5YR 5/8) sand that has pockets of sandy loam; single grained; loose; common dark opaque minerals; strongly acid; clear smooth boundary.

Cg3—48 to 54 inches; bluish gray (5B 5/1) sandy loam; massive; very friable; slightly acid; clear smooth boundary.

Cg4—54 to 60 inches; gray (N 5/0) sand; single grained; loose; slightly acid.

The Nimmo soils have sandy and loamy horizons 25 to 40 inches thick. The soil ranges from extremely acid to strongly acid in the A and B horizons and extremely acid to slightly acid in the C horizon.

The Ap or A horizon has hue of 10YR to 2.5Y, value of 2 to 5, and chroma of 1 or 2. Where value is 2 or 3, the horizon is less than 6 inches thick.

The Btg horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. Mottles of higher chroma are common. The Btg horizon is sandy loam or fine sandy loam. In some pedons, this horizon has thin layers of sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8, or it is neutral with value of 3 to 8. It is sand, fine sand, loamy sand, or sandy loam.

Perquimans Series

The Perquimans series consists of poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Perquimans silt loam; approximately 0.4 mile west of the intersection of State Roads 1300 and 1302, 100 feet north of State Road 1302, in a cultivated field:

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; few fine and medium roots; slightly acid; abrupt smooth boundary.

E—5 to 8 inches; light gray (2.5Y 7/2) silt loam; weak medium granular structure; friable; few fine and medium roots; slightly acid; abrupt smooth boundary.

Btg1—8 to 19 inches; gray (10YR 6/1) silty clay loam; common fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; few faint clay films on faces of peds; medium acid; clear smooth boundary.

Btg2—19 to 31 inches; grayish brown (2.5Y 5/2) clay loam; common coarse distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Btg3—31 to 50 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/8) and light gray (2.5Y 7/2) mottles; weak medium subangular blocky structure; slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Btg4—50 to 62 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct strong brown (7.5YR 5/6) and olive yellow (2.5Y 6/6) mottles; weak medium subangular blocky structure; friable; strongly acid.

The Perquimans soils have loamy horizons that are 40 to more than 60 inches thick. The soil ranges from very strongly acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR to 5Y, value of 2 to 6, and chroma of 1 or 2, or it is neutral and has value of 2 to 6. Where the value is 3 or less, the horizon is less than 6 inches thick.

The E horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is silt loam, loam, or very fine sandy loam.

The AB or BA horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is loam, silt loam, or very fine sandy loam.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. Mottles of higher chroma range from few to many. The Btg horizon is loam, silty clay loam, or clay loam, but it can contain thin layers of silt loam and sandy loam.

The BC or CB horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. Mottles of higher chroma range from few to many. The BC or CB horizon is loam, silt loam, sandy loam, or sandy clay loam.

The C horizon, where present, has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 or 2, or it is neutral and has value of 5 to 8. It is sandy or loamy material, but some pedons contain thin strata of clay.

Portsmouth Series

The Portsmouth series consists of very poorly drained soils that formed in loamy fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Portsmouth loam; approximately 2.2 miles northeast of the intersection of State Roads 1214 and 1223, 100 feet southwest of State Road 1223, 100 feet northeast of a farm path:

Ap—0 to 12 inches; black (10YR 2/1) loam; weak medium granular structure; friable; many fine roots; extremely acid; clear smooth boundary.

E—12 to 16 inches; gray (10YR 6/1) sandy loam; weak coarse granular structure; friable, slightly sticky; common fine pores and old root channels; few fine flakes of mica; extremely acid; clear smooth boundary.

Btg—16 to 36 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles and few fine faint grayish brown mottles; weak medium subangular blocky structure; friable, slightly sticky; common fine pores and old root channels; few distinct clay films on faces of peds; few fine flakes of mica; extremely acid; clear smooth boundary.

2Cg—36 to 60 inches; light brownish gray (10YR 6/2) sand; single grained; loose; few fine flakes of mica; extremely acid.

The Portsmouth soils have loamy horizons that are 24 to 40 inches thick over contrasting sandy horizons. This soil ranges from extremely acid to strongly acid in the A and B horizons unless the surface layer has been limed. It ranges from extremely acid to medium acid in the C horizon. Pebbles, flakes of mica, and other weatherable minerals are few to common in most pedons.

The A or Ap horizon typically has hue of 10YR, value of 2 or 3, and chroma of 0 to 3.

The E horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy loam, fine sandy loam, loam, or their mucky analogs.

The Bt horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral and has value of 4 to 7. Mottles, where present, are in shades of brown, yellow, and red. The Bt horizon is typically sandy clay loam, loam, or clay loam. In some pedons, this horizon has thin layers of sandy loam or loamy sand.

The 2Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral and has value of 5 to 7. Mottles, where present, are in shades of brown and yellow. It is sand or loamy sand. In some pedons, this horizon contains strata or pockets of lenses of sandy loam, clay loam, or sandy clay loam.

Roanoke Series

The Roanoke series consists of poorly drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Roanoke silt loam; approximately 0.4 mile south of the intersection of State Roads 1347 and 1350, 50 feet west of State Road 1347, in a cultivated field:

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

E—5 to 8 inches; light brownish gray (10YR 6/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Btg1—8 to 19 inches; gray (10YR 6/1) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—19 to 33 inches; gray (10YR 5/1) silty clay; common coarse distinct yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm, sticky and plastic; common distinct continuous clay films on faces of peds; few fine flakes of mica; very strongly acid; clear wavy boundary.

Btg3—33 to 43 inches; gray (10YR 5/1) silty clay loam; common coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

Cg1—43 to 57 inches; light brownish gray (10YR 6/2) silt loam; few fine flakes of mica; strongly acid; clear wavy boundary.

Cg2—57 to 72 inches; light brownish gray (10YR 6/2) fine sandy loam; few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine flakes of mica; strongly acid.

The Roanoke soils have clayey Bt horizons 20 to 45 inches thick. The soil is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam, loam, or fine sandy loam.

The Btg horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. Mottles in shades of yellow and brown are common. The Btg horizon is typically clay, clay loam, or silty clay, but it can have thin layers of silty clay loam or sandy clay loam.

The Cg horizon is similar in color to the B horizon and is sandy or loamy.

Scuppernong Series

The Scuppernong series consists of very poorly drained organic soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Scuppernong muck; approximately 2 miles northwest of Parkville, 2 miles northwest of the intersection of State Roads 1223 and 1224, 0.5 mile north of a farm road:

Oa1—0 to 24 inches; black (5YR 2/1) muck; about 5 percent fibers, less than 1 percent rubbed; massive; friable, slightly sticky; common coated and clean sand grains; extremely acid; gradual smooth boundary.

Oa2—24 to 36 inches; dark reddish brown (5YR 3/2) muck; about 10 percent fibers, less than 1 percent rubbed; massive; friable, slightly sticky; few fine and medium decayed roots; extremely acid; clear smooth boundary.

C1—36 to 42 inches; dark brown (7.5YR 4/2) mucky loam; about 15 percent fiber, less than 1 percent rubbed; massive; friable, slightly sticky; very strongly acid; clear smooth boundary.

2C2—42 to 72 inches; mottled dark gray (10YR 4/1) and greenish gray (5GY 6/1) clay loam; massive; friable, slightly sticky; very strongly acid.

The Scuppernong soils have organic materials that range from 16 to 51 inches in thickness. The organic horizons are extremely acid, except where the surface layer has been limed. The underlying material ranges from extremely acid to slightly acid. Logs, stumps, and fragments of wood are in up to 5 percent of the upper organic horizons in cleared areas that are cultivated and are in 5 to 35 percent in undrained areas. Pieces of charcoal range from 2 to 8 percent in the upper tier to less than 2 percent in the lower tiers. Flakes of mica are few to common in the mineral horizons of most pedons.

The surface layer has hue of 5YR to 5Y, value of 2 or 3, and chroma of 1 or 2. The lower tiers of organic material have hue of 2.5Y to 10YR, value of 2 or 3, and chroma of 1 or 2. Fiber content is 5 percent to 45 percent unrubbed and less than 10 percent rubbed. The amount of fiber is highest in the lower tier. Ten inches or more of the subsurface tier is in hue of 5YR or 2.5YR. The organic material of this layer has a greasy feel (colloidal) and is massive under natural wet conditions. Excessive drying causes shrinkage, and hard subangular blocky peds can form. These peds dry irreversibly.

The C mineral layer, where present, is fine sandy loam, sandy loam, or loam, or their mucky analogs. It is high in content of organic matter.

The 2C horizon has hue of 2.5YR to 5Y, value of 3 to 6, and chroma of 1 to 3. It is loam, clay loam, sandy clay loam, sand, loamy sand, or sandy loam.

Seabrook Series

The Seabrook series consists of moderately well drained soils that formed in sandy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Seabrook fine sand; approximately 0.5 mile south of the intersection of State Roads 1222 and 1218, 0.1 mile west of State Road 1218, in a cultivated field:

Ap—0 to 10 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; very friable; few fine and medium roots; medium acid; abrupt smooth boundary.

Bw1—10 to 18 inches; very pale brown (10YR 7/4) fine sand; common medium faint yellow (10YR 7/8) mottles; single grained; loose; few medium roots; strongly acid; clear smooth boundary.

Bw2—18 to 30 inches; very pale brown (10YR 7/4) fine sand; common medium distinct light gray (10YR 7/2) and yellow (10YR 7/8) mottles; single grained; loose; strongly acid; clear smooth boundary.

Cg1—30 to 38 inches; light gray (10YR 7/2) fine sand; common medium distinct yellow (10YR 7/6) and brownish yellow (10YR 6/8) mottles; single grained; loose; strongly acid; clear smooth boundary.

Cg2—38 to 56 inches; light gray (2.5Y 7/2) fine sand; common medium distinct yellow (10YR 7/6) mottles and common medium prominent strong brown (7.5YR 5/8) mottles; single grained; loose; strongly acid; clear smooth boundary.

Cg3—56 to 80 inches; light gray (N 7/0) sand; common medium distinct very pale brown (10YR 7/4) mottles; single grained; loose; strongly acid.

The Seabrook soils have sandy horizons more than 60 inches thick. The soil is strongly acid or medium acid in the A horizon and ranges from very strongly acid to slightly acid in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3.

The Bw horizon has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. The Bw horizon is fine sand, sand, or loamy fine sand.

The upper part of the C horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The lower part of the C horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2, or it is neutral and has value of 6 or 7. The C horizon is fine sand, sand, or loamy fine sand.

State Series

The State Series consists of well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 6 percent.

A typical pedon of State loamy fine sand, 2 to 6 percent slopes; approximately 0.5 mile east of Edenton, 300 feet west of the intersection of North Carolina Highway 32 and State Road 1105, 100 feet south of North Carolina Highway 32:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

E—7 to 13 inches; pale brown (10YR 6/3) loamy fine sand; weak medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—13 to 38 inches; strong brown (7.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few distinct clay films on faces of peds; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt2—38 to 42 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium granular structure; friable; few distinct clay films on faces of peds; few fine flakes of mica; strongly acid; abrupt wavy boundary.

C—42 to 60 inches; brownish yellow (10YR 6/6) sand; weak medium granular structure; friable; few to common fine flakes of mica; strongly acid.

The State soils have loamy horizons that are 40 to 50 inches thick. The soil is very strongly acid or strongly acid throughout the A and B horizons, except where the surface layer has been limed. It ranges from very strongly acid to medium acid in the C horizon.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6.

The E horizon, where present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is loamy fine sand, sandy loam, or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is typically sandy clay loam or clay loam. In some pedons, this horizon has thin layers of fine sandy loam or sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is fine sand, sand, or loamy sand.

Tomahawk Series

The Tomahawk series consists of moderately well drained or somewhat poorly drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Tomahawk loamy fine sand; approximately 0.3 mile south of the intersection of State Roads 1305 and 1002, 100 feet west of State Road 1002, in a cultivated field:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

E—8 to 21 inches; very pale brown (10YR 7/3) loamy fine sand; weak medium granular structure; very friable; few fine roots; common dark colored minerals; strongly acid; clear smooth boundary.

Bt1—21 to 25 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds and bridging sand grains; common dark minerals; very strongly acid; clear smooth boundary.

Bt2—25 to 30 inches; brownish yellow (10YR 6/6) fine sandy loam; few fine distinct yellowish brown (10YR 5/8) and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint clay films on faces of peds; common dark minerals; very strongly acid; clear smooth boundary.

2Eb1—30 to 42 inches; light gray (10YR 7/2) fine sand; common medium distinct yellowish brown (10YR 5/6) and light yellowish brown (2.5Y 6/4) mottles; single grained; loose; common dark minerals; very strongly acid; clear smooth boundary.

2Eb2—42 to 50 inches; brown (10YR 5/3) fine sand; single grained; loose; common dark minerals; very strongly acid; clear smooth boundary.

2Bhb—50 to 55 inches; black (10YR 2/1) fine sand; single grained; loose; strongly acid; clear smooth boundary.

2E'b—55 to 62 inches; gray (10YR 6/1) fine sand; single grained; loose; common dark minerals; strongly acid.

The Tomahawk soils have loamy and sandy horizons more than 60 inches thick. The soil is very strongly acid or strongly acid in the upper horizons, except where the surface layer has been limed. It ranges from very strongly acid to slightly acid in the lower horizons.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is loamy fine sand, loamy sand, or sand.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 6. The lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 3. Mottles in shades of gray, brown, or yellow may be present. The Bt horizon is typically fine sandy loam, but it can have thin layers of loamy sand or loamy fine sand.

The 2Eb or 2E'b horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. It is fine sand or sand.

The 2Bhb horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 or 2. It is loamy sand, sand, or fine sand.

Tomotley Series

The Tomotley series consists of poorly drained soils that formed in loamy fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Tomotley fine sandy loam; 0.3 mile northwest of the intersection of North Carolina Highway 32 and Business U.S. Highway 17, 100 feet east of North Carolina Highway 32:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

Btg1—7 to 12 inches; light gray (10YR 7/1) fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine and medium roots; slightly acid; clear smooth boundary.

Btg2—12 to 42 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Cg1—42 to 50 inches; mottled light brownish gray (2.5Y 6/2), gray (10YR 6/1), and yellowish brown (10YR 5/8) sandy loam that has pockets of loamy sand; weak fine granular structure; friable; very strongly acid; clear smooth boundary.

Cg2—50 to 72 inches; mottled yellowish brown (10YR 5/6), gray (10YR 6/1), and strong brown (7.5YR 5/8) loamy sand that has pockets of sandy loam; weak fine granular structure; friable; very strongly acid.

The Tomotley soils have loamy horizons 40 to 60 inches thick. The soil ranges from extremely acid to strongly acid in the upper part of the soil, except where the surface layer has been limed. Below about 50 inches, it ranges from extremely acid to medium acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It is typically sandy clay loam or clay loam but can have thin layers of sandy loam or fine sandy loam.

The C horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of red, olive, yellow, brown, or gray. The C horizon is sandy loam, loamy sand, or sand.

Valhalla Series

The Valhalla series consists of well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 6 percent.

A typical pedon of Valhalla fine sand, 0 to 6 percent slopes; approximately 150 feet west of the intersection of North Carolina Highway 32 and State Road 1303, in a cultivated field:

Ap—0 to 10 inches; brown (10YR 5/3) fine sand; weak fine granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

E—10 to 21 inches; yellow (10YR 7/6) fine sand; weak fine granular structure; very friable; few fine roots; many fine dark opaque minerals; medium acid; clear smooth boundary.

Bt1—21 to 30 inches; strong brown (7.5YR 5/8) fine sandy loam; weak fine subangular blocky structure; friable; common distinct clay bridgings of sand grains; many fine dark opaque minerals; strongly acid; gradual wavy boundary.

Bt2—30 to 40 inches; yellowish brown (10YR 5/8) loamy fine sand; weak fine granular structure; very friable; few distinct clay bridging of sand grains; many fine dark opaque minerals; strongly acid; gradual wavy boundary.

2Eb1—40 to 50 inches; yellow (10YR 7/8) fine sand; single grained; loose; many fine dark opaque minerals; strongly acid; clear wavy boundary.

2Eb2—50 to 60 inches; very pale brown (10YR 8/4) fine sand; common medium faint yellow (10YR 7/6) mottles; single grained; loose; many fine dark opaque minerals; strongly acid; clear wavy boundary.

2Bhb—60 to 70 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; loose; sand grains coated with organic matter; very strongly acid; clear smooth boundary.

2E'b—70 to 75 inches; light gray (10YR 6/1) fine sand; single grained; loose; many fine dark opaque minerals; very strongly acid; clear smooth boundary.

2B'hb—75 to 99 inches; black (10YR 2/1) fine sand; single grained; loose; sand grains coated with organic matter; very strongly acid.

The Valhalla soils have loamy and sandy horizons more than 80 inches thick. The soil ranges from very strongly acid to medium acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 1 to 3.

The E horizon has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. It is fine sand, sand, loamy fine sand, or loamy sand.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 4 to 8. The upper part of the Bt horizon is typically fine sandy loam or sandy loam. In some pedons, it has a thin layer of sandy clay loam. The lower part of the Bt horizon is similar in color and is loamy fine sand or loamy sand.

The 2Eb or 2E'b horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 to 8. It is sand or fine sand.

The 2Bhb or 2B'hb horizon, where present, has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 or 2. It is sand or fine sand.

Wahee Series

The Wahee series consists of somewhat poorly drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 2 percent.

A typical pedon of Wahee fine sandy loam, 0 to 2 percent slopes; approximately 0.3 mile north of Virginia Fork, 0.3 mile north of the intersection of State Road 1208 and North Carolina Highway 32, 100 feet east of North Carolina Highway 32:

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; medium acid; clear smooth boundary.

Bt1—6 to 12 inches; yellowish brown (10YR 5/4) clay; common medium distinct grayish brown (10YR 5/2) mottles and common medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine and medium roots; common fine pores; few fine opaque minerals; very strongly acid; clear smooth boundary.

Btg1—12 to 24 inches; light brownish gray (10YR 6/2) clay loam; common fine faint gray mottles and common medium distinct brownish yellow (10YR 6/8) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; common fine pores; thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg2—24 to 36 inches; gray (10YR 6/1) clay; common medium distinct brownish yellow (10YR 6/8) and dark gray (10YR 4/1) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine pores; thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg3—36 to 40 inches; light gray (5Y 7/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Cg—40 to 65 inches; mottled light gray (10YR 7/1) and brownish yellow (10YR 6/6) sandy loam that has pockets of sandy clay loam; massive; friable; few fine flakes of mica; few fine grains of feldspar; common fine opaque minerals; very strongly acid.

The Wahee soils have clayey and loamy horizons 35 to 60 inches thick. The soil is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The A2 horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is mottled with chroma of 2 or less. The lower Bt horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The Bt horizon is clay, clay loam, or silty clay loam, and it has thin layers of sandy clay loam.

The C horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. It is commonly stratified sand and loamy sand, or it is sand, loamy sand, sandy loam, or sandy clay loam. The C horizon has mottles in shades of red, brown, and yellow in some pedons.

Wando Series

The Wando series consists of excessively drained soils that formed in sandy marine and fluvial sediments. Slopes range from 0 to 5 percent.

A typical pedon of Wando fine sand, 0 to 5 percent slopes; approximately 0.3 mile east of the intersection of State Road 1201 and U.S. Highway 17, and 400 feet south of the highway, in a cultivated field:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) fine sand; weak medium granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

Bw1—10 to 36 inches; yellowish brown (10YR 5/6) fine sand; weak medium granular structure; very friable; few fine and medium roots; sand grains are coated; common dark minerals; slightly acid; clear smooth boundary.

Bw2—36 to 48 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; sand grains are coated; common dark minerals; medium acid; clear smooth boundary.

Bw3—48 to 82 inches; yellow (10YR 7/6) fine sand; single grained; loose; sand grains are coated; common dark minerals; medium acid.

The Wando soils have sandy horizons 80 inches or more thick. The soil ranges from medium acid to neutral, except where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 3.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 8, and chroma of 3 to 8. It is loamy fine sand or fine sand.

Yeopim Series

The Yeopim series consists of moderately well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 6 percent.

A typical pedon of Yeopim loam, 0 to 2 percent slopes; approximately 0.1 mile east of the intersection of State Roads 1114 and 1113, 50 feet north of State Road 1114, in a cultivated field:

Ap—0 to 8 inches; grayish brown (10YR 5/2) loam; weak medium granular structure; friable; few fine and medium roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 23 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—23 to 30 inches; yellowish brown (10YR 5/4) clay loam; few fine faint brownish yellow and light gray mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—30 to 42 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

2C1—42 to 55 inches; light gray (10YR 7/2) loamy sand; common coarse distinct yellowish brown (10YR 5/6) and brown (10YR 5/3) mottles; single grained; loose; very strongly acid; clear smooth boundary.

2C2—55 to 62 inches; yellowish brown (10YR 5/6) loamy sand; single grained; loose; very strongly acid.

The Yeopim soils have horizons that are 40 to more than 60 inches thick. The soil ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. Where the value is 3, the horizon is less than 6 inches thick.

The E horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. The lower part of the Bt horizon has colors similar to those in the upper part and, in addition, contains mottles of low or high chroma. The Bt horizon is commonly silty clay loam, clay loam, or loam, but can contain thin layers of silt loam, sandy clay loam, fine sandy loam, very fine sandy loam, or silty clay.

The C or 2C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 6. It is sandy or loamy, but some pedons contain thin strata of clay.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bottom land. The normal flood plain of a stream, subject to flooding.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively

drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Edge (wildlife). The transitional zone where one cover type (vegetation) ends and another begins.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Applicaton of water to soils to assist in production of crops.—

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops that involves no seedbed preparation other than opening the soil for the purpose of placing the seed at the intended depth.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that

water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Well graded. Refers to soil material consisting of course grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wetness (in tables). A general term for soils that have a seasonal high water table.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION, CHOWAN COUNTY

[Based on data recorded in the period 1951-73 at Edenton, North Carolina]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	^{o}F	^{o}F	^{o}F	^{o}F	^{o}F	Units	In	In	In		In
January----	52.8	32.6	42.7	74	11	24	4.13	2.41	5.65	8	2.0
February---	54.6	32.9	43.8	75	13	15	3.70	2.35	4.91	7	1.7
March------	61.8	39.8	50.8	83	23	151	4.02	2.67	5.25	7	.9
April------	73.4	50.0	61.7	91	32	351	3.28	1.81	4.57	6	.0
May--------	79.9	58.2	69.1	92	40	592	2.93	1.74	3.98	6	.0
June-------	85.3	66.1	75.8	97	50	774	4.22	1.91	6.19	7	.0
July-------	87.3	69.8	78.6	97	56	887	6.99	3.90	9.72	9	.0
August-----	86.3	68.7	77.5	96	53	853	5.93	2.64	8.74	7	.0
September--	81.5	63.5	72.5	92	46	675	4.52	2.29	6.46	6	.0
October----	71.8	52.4	62.1	86	29	381	3.32	1.02	5.19	5	.0
November---	62.5	41.6	52.1	81	24	125	3.01	1.53	4.28	5	.0
December---	56.3	36.2	46.2	74	13	102	3.04	1.93	4.04	6	.0
Yearly:											
Average--	71.1	51.0	61.1	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	10	---	---	---	---	---	---
Total----	---	---	---	---	---	4,930	49.09	44.73	51.06	79	4.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 ^{o}F).

TABLE 2.--TEMPERATURE AND PRECIPITATION, PERQUIMANS COUNTY

[Based on data recorded in the period 1951-78 at Elizabeth City, North Carolina]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	50.4	32.0	41.2	76	11	39	3.70	2.31	4.95	7	1.6
February---	53.5	33.9	43.7	77	15	27	3.72	2.33	4.96	7	1.0
March------	59.7	40.0	49.9	84	25	118	3.74	2.42	4.93	7	.8
April------	70.1	48.7	59.4	90	31	282	2.94	1.63	4.08	6	.0
May--------	76.7	57.4	67.1	93	40	530	4.13	2.26	5.78	7	.0
June-------	83.8	65.5	74.7	97	49	741	4.02	2.24	5.58	7	.0
July-------	87.2	69.6	78.4	97	57	880	5.26	2.89	7.34	8	.0
August-----	86.1	69.1	77.6	95	55	856	5.82	3.15	8.16	8	.0
September--	80.9	63.0	72.0	94	46	660	4.10	1.45	6.28	5	.0
October----	71.5	52.3	61.9	88	31	369	3.28	1.16	5.03	5	.0
November---	62.4	41.9	52.2	81	23	121	2.79	1.28	4.08	5	.0
December---	53.6	34.3	44.0	76	25	63	3.21	1.72	4.52	7	.8
Yearly:											
Average--	69.7	50.6	60.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	11	---	---	---	---	---	---
Total----	---	---	---	---	---	4,686	46.71	42.38	51.65	79	4.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 °F).

TABLE 3.--FREEZE DATES IN SPRING AND FALL, CHOWAN COUNTY

[Based on data recorded in the period 1951-73 at Edenton, North Carolina]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 16	March 29	April 10
2 years in 10 later than--	March 10	March 23	April 5
5 years in 10 later than--	February 27	March 13	March 26
First freezing temperature in fall:			
1 year in 10 earlier than--	November 9	November 6	October 26
2 years in 10 earlier than--	November 21	November 14	October 31
5 years in 10 earlier than--	December 13	December 1	November 9

TABLE 4.--FREEZE DATES IN SPRING AND FALL, PERQUIMANS COUNTY

[Based on data recorded in the period 1951-78 at Elizabeth City, North Carolina]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 15	March 28	April 15
2 years in 10 later than--	March 7	March 23	April 10
5 years in 10 later than--	February 19	March 21	April 1
First freezing temperature in fall:			
1 year in 10 earlier than--	November 20	October 31	October 22
2 years in 10 earlier than--	November 26	November 6	October 28
5 years in 10 earlier than--	December 9	November 19	November 7

TABLE 5.--GROWING SEASON, CHOWAN COUNTY

[Based on data recorded in the period 1951-73 at Edenton, North Carolina]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	250	232	207
8 years in 10	262	242	214
5 years in 10	286	262	227
2 years in 10	311	281	240
1 year in 10	327	291	247

TABLE 6.--GROWING SEASON, PERQUIMANS COUNTY

[Based on data recorded in the period 1951-78 at Elizabeth City, North Carolina]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	260	223	198
8 years in 10	271	233	205
5 years in 10	293	251	219
2 years in 10	314	269	233
1 year in 10	325	278	241

TABLE 7.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Chowan County	Perquimans County	Total--	
				Area	Extent
		Acres	Acres	Acres	Pct
AaA	Altavista fine sandy loam, 0 to 2 percent slopes	3,860	2,615	6,475	2.3
Ap	Arapahoe fine sandy loam	2,440	12,860	15,300	5.4
At	Augusta fine sandy loam	3,175	4,210	7,385	2.6
Au	Augusta-Urban land complex	460	0	460	0.2
BoA	Bojac loamy fine sand, 0 to 3 percent slopes	285	405	690	0.2
CaB	Cainhoy fine sand, 0 to 6 percent slopes	1,545	445	1,990	0.7
Cf	Cape Fear loam	1,775	5,930	7,705	2.7
Ch	Chapanoke silt loam	1,260	3,425	4,685	1.7
CO	Chowan silt loam	5,065	7,940	13,005	4.6
CtB	Conetoe loamy sand, 0 to 5 percent slopes	4,565	1,465	6,030	2.1
DgA	Dogue fine sandy loam, 0 to 2 percent slopes	5,590	1,825	7,415	2.6
DgB	Dogue fine sandy loam, 2 to 6 percent slopes	2,620	1,940	4,560	1.6
DO	Dorovan muck	7,075	5,315	12,390	4.4
Ds	Dragston loamy fine sand	1,680	3,290	4,970	1.8
Ec	Echaw fine sand	3,515	1,045	4,560	1.6
Ic	Icaria fine sandy loam	5,000	1,705	6,705	2.4
Ly	Lynn Haven sand	2,550	215	2,765	1.0
MuA	Munden loamy fine sand, 0 to 2 percent slopes	560	2,300	2,860	1.0
Nm	Nimmo loamy fine sand	820	1,960	2,780	1.0
Pe	Perquimans silt loam	2,450	9,705	12,155	4.3
Pt	Portsmouth loam	8,820	19,280	28,100	10.0
Ro	Roanoke silt loam	18,300	45,055	63,355	22.5
Sc	Scuppernong muck	1,560	6,210	7,770	2.8
Se	Seabrook fine sand	1,665	2,315	3,980	1.4
StA	State loamy fine sand, 0 to 2 percent slopes	2,245	1,820	4,065	1.4
StB	State loamy fine sand, 2 to 6 percent slopes	1,750	1,110	2,860	1.0
SuA	State-Urban land complex, 0 to 2 percent slopes	295	100	395	0.1
Tm	Tomahawk loamy fine sand	4,320	1,425	5,745	2.0
To	Tomotley fine sandy loam	7,205	14,875	22,080	7.8
UD	Udorthents, loamy	185	375	560	0.2
Ur	Urban land	645	0	645	0.2
VaB	Valhalla fine sand, 0 to 6 percent slopes	1,950	1,250	3,200	1.1
WaA	Wahee fine sandy loam, 0 to 2 percent slopes	2,240	1,550	3,790	1.3
WnB	Wando fine sand, 0 to 5 percent slopes	5,060	765	5,825	2.1
YeA	Yeopim loam, 0 to 2 percent slopes	1,845	1,120	2,965	1.1
YeB	Yeopim loam, 2 to 6 percent slopes	425	690	1,115	0.4
	Water	400	505	905	0.3
	Total	115,200	167,040	282,240	100.0

TABLE 8.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Corn	Soybeans	Tobacco	Peanuts	Wheat	Cotton lint	Watermelons
	Bu	Bu	Lbs	Lbs	Bu	Lbs	Tons
AaA----------------------- Altavista	125	45	2,600	3,500	55	650	11
Ap----------------------- Arapahoe	140	45	---	---	50	---	---
At----------------------- Augusta	120	40	---	3,500	45	---	11
Au----------------------- Augusta-Urban land	---	---	---	---	---	---	---
BoA----------------------- Bojac	95	30	1,800	4,100	40	550	9
CaB----------------------- Cainhoy	55	20	---	2,000	20	300	8
Cf----------------------- Cape Fear	130	45	---	---	50	---	---
Ch----------------------- Chapanoke	130	45	---	3,200	55	550	---
CO----------------------- Chowan	---	---	---	---	---	---	---
CtB----------------------- Conetoe	90	25	2,000	2,600	40	550	9
DgA----------------------- Dogue	120	45	2,500	3,600	55	550	---
DgB----------------------- Dogue	120	40	---	3,500	50	500	---
DO----------------------- Dorovan	---	---	---	---	---	---	---
Ds----------------------- Dragston	125	40	---	3,800	50	600	12
Ec----------------------- Echaw	70	25	---	3,000	35	---	10
Ic----------------------- Icaria	120	35	---	---	50	---	---
Ly----------------------- Lynn Haven	70	20	---	---	20	---	---
MuA----------------------- Munden	120	35	2,500	3,800	45	650	10
Nm----------------------- Nimmo	130	45	---	3,800	45	---	11

TABLE 8.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Soybeans	Tobacco	Peanuts	Wheat	Cotton lint	Watermelons
	Bu	Bu	Lbs	Lbs	Bu	Lbs	Tons
Pe----------------------- Perquimans	135	45	---	---	55	---	---
Pt----------------------- Portsmouth	140	45	---	---	55	---	---
Ro----------------------- Roanoke	130	40	---	---	45	---	---
Sc----------------------- Scuppernong	125	35	---	---	50	---	---
Se----------------------- Seabrook	75	30	---	3,000	---	350	8
StA---------------------- State	120	40	2,700	3,500	55	---	10
StB---------------------- State	120	40	2,700	3,300	50	---	10
SuA---------------------- State-Urban land	---	---	---	---	---	---	---
Tm----------------------- Tomahawk	100	35	---	3,800	45	650	11
To----------------------- Tomotley	130	40	---	---	45	---	---
VaB---------------------- Valhalla	70	20	---	2,600	20	600	11
WaA---------------------- Wahee	100	40	---	---	40	---	---
WnB---------------------- Wando	55	30	---	2,000	40	400	8
YeA---------------------- Yeopim	130	45	3,000	3,400	55	650	---
YeB---------------------- Yeopim	120	40	2,800	3,200	50	575	---

TABLE 9.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	4,460	---	---	---
II	49,475	8,535	34,220	6,720
III	183,590	---	166,025	17,565
IV	12,525	---	10,535	1,990
V	---	---	---	---
VI	---	---	---	---
VII	30,080	---	30,080	---
VIII	---	---	---	---

TABLE 10.--WOODLAND SITE INDEX VALUES

Indicator forest type or species	Very high	High	Moderately high	Moderate	Low
	Site Index				
Yellow-poplar	106+	96-105	86-95	76-85	75-
Sweetgum	96+	86-95	76-85	66-75	65-
Water oak	96+	86-95	76-85	66-75	65-
Loblolly pine	96+	86-95	76-85	66-75	65-
Southern red oak	86+	76-85	66-75	56-65	55-

TABLE 11.--POTENTIAL YEARLY GROWTH OR YIELD OF LOBLOLLY PINE

[Potential average yearly growth per acre in Board Feet International (1/8-inch Rule) for a fully stocked stand 7 inches in diameter, breast high and over]

Age in years	Site index in feet						
	60	70	80	90	100	110	120
	Growth in board feet						
15	---	3	10	57	120	200	307
20	---	75	150	250	375	500	650
25	80	180	300	440	580	740	940
30	150	283	417	567	733	917	1,100
35	200	357	500	657	829	1,029	1,229
40	250	400	550	712	888	1,075	1,288
45	278	433	578	744	911	1,100	1,300
50	300	440	590	750	910	1,090	1,290
55	318	445	591	736	900	1,073	1,255
60	317	442	575	717	875	1,050	1,217
65	315	438	562	692	846	1,015	1,777
70	314	421	543	671	814	971	1,136
75	307	413	527	647	787	933	1,087
80	300	400	506	625	756	894	1,044

TABLE 12.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
AaA----------------- Altavista	2w	Slight	Moderate	Slight	Loblolly pine--------	91	Loblolly pine, yellow-poplar, black walnut, sweetgum, American sycamore, cherrybark oak.
					Longleaf pine--------	84	
					Shortleaf pine-------	77	
					Sweetgum-------------	84	
					White oak------------	---	
Ap------------------ Arapahoe	2w	Slight	Severe	Severe	Loblolly pine--------	95	Loblolly pine, sweetgum, American sycamore.
					Sweetgum-------------	---	
					Red maple------------	---	
					Water tupelo---------	---	
					Baldcypress----------	---	
					Pond pine------------	65	
					Yellow-poplar--------	---	
At------------------ Augusta	2w	Slight	Moderate	Slight	Loblolly pine--------	90	Loblolly pine, sweetgum, American sycamore, yellow-poplar, cherrybark oak.
					Sweetgum-------------	90	
					American sycamore----	90	
					White oak------------	80	
					Southern red oak-----	80	
					Water oak------------	---	
					Shortleaf pine-------	---	
BoA----------------- Bojac	3o	Slight	Slight	Slight	Southern red oak-----	70	Loblolly pine, sweetgum.
					Virginia pine--------	75	
					Loblolly pine--------	80	
					Sweetgum-------------	80	
CaB----------------- Cainhoy	3s	Slight	Moderate	Moderate	Longleaf pine--------	70	Longleaf pine.
					Loblolly pine--------	76	
Cf------------------ Cape Fear	1w	Slight	Severe	Severe	Sweetgum-------------	---	Loblolly pine, water tupelo, American sycamore, sweetgum.
					Loblolly pine--------	100	
					Water oak------------	---	
					Water tupelo---------	---	
					Baldcypress----------	---	
Ch------------------ Chapanoke	2w	Slight	Moderate	Moderate	Loblolly pine--------	92	Loblolly pine, yellow-poplar, sweetgum, American sycamore.
					Sweetgum-------------	---	
					Yellow-poplar--------	---	
					Water oak------------	---	
					Southern red oak-----	---	

TABLE 12.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
CO: Chowan	2w	Slight	Severe	Severe	Water tupelo	80	Baldcypress, green ash.
					Green ash	98	
					Baldcypress	---	
					Red maple	---	
					Sweetgum	---	
					Pond pine	---	
					Atlantic white-cedar	---	
CtB: Conetoe	3s	Slight	Moderate	Moderate	Loblolly pine	80	Loblolly pine.
					Longleaf pine	65	
DgA, DgB: Dogue	2w	Slight	Moderate	Slight	Loblolly pine	90	Loblolly pine.
					Southern red oak	80	
					Sweetgum	90	
					Yellow-poplar	93	
					White oak	80	
DO: Dorovan	4w	Slight	Severe	Severe	Blackgum	70	Baldcypress.
					Sweetbay	---	
Ds: Dragston	2w	Slight	Moderate	Slight	Southern red oak	80	Loblolly pine, sweetgum, yellow-poplar.
					Loblolly pine	85	
					Sweetgum	90	
					Yellow-poplar	90	
					White oak	---	
Ec: Echaw	3s	Slight	Moderate	Slight	Longleaf pine	68	Longleaf pine, loblolly pine, shortleaf pine.
					Loblolly pine	85	
					Slash pine	80	
Ic: Icaria	2w	Slight	Moderate	Moderate	Loblolly pine	86	Loblolly pine, sweetgum.
					Sweetgum	---	
					Red maple	---	
					Water oak	---	
					Sweetbay	---	
					Redbay	---	
Ly: Lynn Haven	3w	Slight	Moderate	Moderate	Slash pine	90	Loblolly pine.
					Loblolly pine	80	
					Longleaf pine	70	
					Pond pine	70	
MuA: Munden	2w	Slight	Moderate	Slight	Loblolly pine	90	Loblolly pine.
					Sweetgum	90	
					White oak	75	
Nm: Nimmo	2w	Slight	Severe	Severe	Loblolly pine	95	Loblolly pine, sweetgum.
					Sweetgum	95	
					White oak	80	
Pe: Perquimans	2w	Slight	Severe	Severe	Loblolly pine	94	Loblolly pine, sweetgum, American sycamore.
					Green ash	---	
					Sweetgum	---	
					Water oak	---	

TABLE 12.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
Pt------------------ Portsmouth	1w	Slight	Severe	Severe	Loblolly pine-------- Sweetgum------------- Red maple------------ Water oak------------ Willow oak----------- Sweetbay------------- Redbay----------------	96 --- --- --- --- --- ---	Loblolly pine, sweetgum.
Ro------------------ Roanoke	1w	Slight	Severe	Severe	Loblolly pine-------- Sweetgum------------- Red maple------------	97 --- ---	Loblolly pine.
Sc------------------ Scuppernong	4w	Slight	Severe	Severe	Sweetgum------------- Pond pine------------ Baldcypress---------- Atlantic white-cedar-	--- --- --- ---	Loblolly pine.
Se------------------ Seabrook	3s	Slight	Moderate	Moderate	Loblolly pine-------- Slash pine----------- Longleaf pine--------	87 87 70	Loblolly pine, longleaf pine.
StA, StB----------- State	1o	Slight	Slight	Slight	Southern red oak----- Yellow-poplar-------- Virginia pine-------- Loblolly pine--------	85 100 85 95	Black walnut, yellow-poplar, loblolly pine.
Tm------------------ Tomahawk	3w	Slight	Moderate	Moderate	Loblolly pine-------- Longleaf pine-------- Slash pine-----------	80 70 80	Loblolly pine, longleaf pine.
To------------------ Tomotley	2w	Slight	Severe	Severe	Loblolly pine-------- Slash pine----------- Sweetgum------------- Water tupelo---------	94 91 90 ---	Loblolly pine, sweetgum, American sycamore.
VaB----------------- Valhalla	3s	Slight	Moderate	Moderate	Loblolly pine--------	80	Loblolly pine, longleaf pine.
WaA----------------- Wahee	2w	Slight	Moderate	Moderate	Loblolly pine-------- Slash pine----------- Sweetgum------------- Blackgum------------- Water oak------------ Swamp chestnut oak--- Willow oak----------- Southern red oak-----	86 86 90 --- --- --- --- ---	Loblolly pine, sweetgum American sycamore, water oak.
WnB----------------- Wando	3s	Slight	Moderate	Moderate	Longleaf pine-------- Loblolly pine-------- Slash pine-----------	70 80 80	Loblolly pine, longleaf pine.
YeA, YeB----------- Yeopim	2w	Slight	Moderate	Slight	Loblolly pine-------- Sweetgum------------- Yellow-poplar-------- Southern red oak----- White oak------------	91 --- --- --- ---	Loblolly pine.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the needkfor onsite investigation]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA: Altavista	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ap: Arapahoe	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
At: Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Au:					
Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
BoA: Bojac	Slight	Slight	Slight	Slight	Moderate: droughty.
CaB: Cainhoy	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
Cf: Cape Fear	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ch: Chapanoke	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
CO: Chowan	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
CtB: Conetoe	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
DgA: Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
DgB: Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
DO: Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Ds: Dragston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
Ec: Echaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ic Icaria	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ly Lynn Haven	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
MuA Munden	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Nm Nimmo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pe Perquimans	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Pt Portsmouth	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ro Roanoke	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Sc Scuppernong	Severe: wetness, excess humus, flooding.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Se Seabrook	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
StA State	Slight	Slight	Slight	Slight	Slight.
StB State	Slight	Slight	Moderate: slope.	Slight	Slight.
SuA:					
State	Slight	Slight	Slight	Slight	Slight.
Urban land.					
Tm Tomahawk	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
To Tomotley	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
UD. Udorthents					
Ur. Urban land					
VaB Valhalla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WaA------------------- Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WnB------------------- Wando	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
YeA------------------- Yeopim	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: erodes easily.	Moderate: wetness.
YeB------------------- Yeopim	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Severe: erodes easily.	Moderate: wetness.

TABLE 14.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA: Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ap: Arapahoe	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Fair.
At: Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Au: Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.										
BoA: Bojac	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CaB: Cainhoy	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Cf: Cape Fear	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
Ch: Chapanoke	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CO: Chowan	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
CtB: Conetoe	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Fair	Very poor.
DgA: Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
DgB: Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DO: Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Ds: Dragston	Poor	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Fair.
Ec: Echaw	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Ic: Icaria	Good	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
Ly: Lynn Haven	Poor	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
MuA: Munden	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.

TABLE 14.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Nm: Nimmo	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Pe: Perquimans	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Fair.
Pt: Portsmouth	Fair	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
Ro: Roanoke	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair.
Sc: Scuppernong	Fair	Fair	Good	Good	Good	Poor	Good	Fair	Good	Fair.
Se: Seabrook	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
StA, StB: State	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
SuA: State	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Urban land.										
Tm: Tomahawk	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Good	Poor.
To: Tomotley	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
UD. Udorthents										
Ur. Urban land										
VaB: Valhalla	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WaA: Wahee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WnB: Wando	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
YeA: Yeopim	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
YeB: Yeopim	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 15.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA: Altavista	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ap: Arapahoe	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
At: Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Au:						
Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Urban land.						
BoA: Bojac	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
CaB: Cainhoy	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Cf: Cape Fear	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Ch: Chapanoke	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.
CO: Chowan	Severe: excess humus, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
CtB: Conetoe	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
DgA: Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
DgB: Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
DO: Dorovan	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding, excess humus.

TABLE 15.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ds: Dragston	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
Ec: Echaw	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
Ic: Icaria	Severe: wetness, cutbanks cave.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.
Ly: Lynn Haven	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
MuA: Munden	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Nm: Nimmo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pe: Perquimans	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.
Pt: Portsmouth	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Ro: Roanoke	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Sc: Scuppernong	Severe: cutbanks cave, excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness.	Severe: wetness, excess humus.
Se: Seabrook	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
StA: State	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: low strength.	Slight.
StB: State	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: low strength.	Slight.
SuA:						
State	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: low strength.	Slight.
Urban land.						
Tm: Tomahawk	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.

TABLE 15.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
To----------------- Tomotley	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.
UD. Udorthents						
Ur. Urban land						
VaB---------------- Valhalla	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
WaA---------------- Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
WnB---------------- Wando	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
YeA---------------- Yeopim	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
YeB---------------- Yeopim	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.

TABLE 16.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA----------------- Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
Ap------------------ Arapahoe	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
At------------------ Augusta	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
Au: Augusta------------	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
Urban land.					
BoA----------------- Bojac	Moderate: wetness.	Severe: seepage.	Severe: wetness, seepage.	Severe: seepage.	Fair: thin layer.
CaB----------------- Cainhoy	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Cf------------------ Cape Fear	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
Ch------------------ Chapanoke	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness.	Poor: wetness.
CO------------------ Chowan	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus.
CtB----------------- Conetoe	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
DgA, DgB------------ Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
DO------------------ Dorovan	Severe: flooding, ponding, poor filter.	Severe: flooding, excess humus, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: ponding, excess humus.

TABLE 16.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ds----------------- Dragston	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, thin layer.
Ec----------------- Echaw	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
Ic----------------- Icaria	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: wetness.
Ly----------------- Lynn Haven	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
MuA---------------- Munden	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: wetness, thin layer.
Nm----------------- Nimmo	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Pe----------------- Perquimans	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Pt----------------- Portsmouth	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ro----------------- Roanoke	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Sc----------------- Scuppernong	Severe: wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: wetness, seepage, excess humus.	Severe: seepage, wetness.	Poor: excess humus, wetness.
Se----------------- Seabrook	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
StA, StB----------- State	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, thin layer.
SuA: State--------------	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, thin layer.
Urban land.					

TABLE 16.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Tm------------------ Tomahawk	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: thin layer.
To------------------ Tomotley	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
UD. Udorthents					
Ur. Urban land					
VaB----------------- Valhalla	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
WaA----------------- Wahee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
WnB----------------- Wando	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
YeA, YeB------------ Yeopim	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness.	Fair: wetness, thin layer.

TABLE 17.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Topsoil
AaA: Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Good.
Ap: Arapahoe	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
At: Augusta	Fair: wetness.	Improbable: excess fines.	Fair: small stones.
Au: Augusta	Fair: wetness.	Improbable: excess fines.	Fair: small stones.
Urban land.			
BoA: Bojac	Good	Probable	Fair: too sandy.
CaB: Cainhoy	Good	Probable	Poor: too sandy.
Cf: Cape Fear	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Ch: Chapanoke	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
CO: Chowan	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
CtB: Conetoe	Good	Probable	Fair: too sandy.
DgA, DgB: Dogue	Fair: wetness.	Probable	Poor: thin layer.
DO: Dorovan	Poor: wetness.	Probable	Poor: excess humus, wetness.
Ds: Dragston	Fair: wetness.	Probable	Fair: too sandy, thin layer.
Ec: Echaw	Fair: wetness.	Probable	Poor: too sandy.
Ic: Icaria	Poor: wetness.	Probable	Poor: wetness.
Ly: Lynn Haven	Poor: wetness.	Probable	Poor: too sandy, wetness.

TABLE 17.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
MuA: Munden	Fair: wetness.	Probable	Fair: thin layer.
Nm: Nimmo	Poor: wetness.	Probable	Poor: thin layer, wetness.
Pe: Perquimans	Poor: wetness, low strength.	Improbable: excess fines.	Poor: wetness.
Pt: Portsmouth	Poor: wetness.	Probable	Poor: wetness.
Ro: Roanoke	Poor: wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Sc: Scuppernong	Poor: wetness.	Probable	Poor: excess humus, wetness.
Se: Seabrook	Fair: wetness.	Probable	Poor: too sandy.
StA, StB: State	Good	Probable	Fair: too sandy.
SuA:			
State	Good	Probable	Fair: too sandy.
Urban land.			
Tm: Tomahawk	Fair: wetness.	Probable	Fair: too sandy.
To: Tomotley	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
UD. Udorthents			
Ur. Urban land			
VaB: Valhalla	Good	Probable	Poor: too sandy.
WaA: Wahee	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
WnB: Wando	Good	Probable	Poor: too sandy.
YeA, YeB: Yeopim	Poor: low strength.	Improbable: excess fines.	Good.

TABLE 18.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--			
	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaA: Altavista	Moderate: wetness.	Moderate: deep to water.	Favorable	Wetness	Wetness	Favorable.
Ap: Arapahoe	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness	Wetness	Wetness.
At: Augusta	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness	Wetness.
Au:						
Augusta	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness	Wetness.
Urban land.						
BoA: Bojac	Severe: piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing	Droughty.
CaB: Cainhoy	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Cf: Cape Fear	Severe: hard to pack, wetness.	Slight	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ch: Chapanoke	Severe: wetness, piping.	Severe: cutbanks cave, slow refill.	Favorable	Wetness, erodes easily.	Wetness, erodes easily.	Wetness, erodes easily.
CO: Chowan	Severe: excess humus, wetness.	Severe: slow refill.	Flooding	Wetness, flooding.	Wetness	Wetness.
CtB: Conetoe	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
DgA: Dogue	Severe: wetness.	Severe: slow refill, cutbanks cave.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
DgB: Dogue	Severe: wetness.	Severe: slow refill, cutbanks cave.	Slope	Wetness, soil blowing, slope.	Wetness, soil blowing.	Favorable.
DO: Dorovan	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding	Wetness.
Ds: Dragston	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, soil blowing.	Wetness, droughty.

TABLE 18.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Ec---------------- Echaw	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
Ic---------------- Icaria	Severe: wetness, piping, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness---------	Wetness, too sandy.	Wetness.
Ly---------------- Lynn Haven	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
MuA--------------- Munden	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, soil blowing.	Wetness, too sandy, soil blowing.	Favorable.
Nm---------------- Nimmo	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
Pe---------------- Perquimans	Severe: piping, wetness.	Severe: slow refill.	Favorable------	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Pt---------------- Portsmouth	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness---------	Wetness, too sandy.	Wetness.
Ro---------------- Roanoke	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Sc---------------- Scuppernong	Severe: excess humus, wetness.	Slight---------	Subsides-------	Wetness---------	Wetness---------	Wetness.
Se---------------- Seabrook	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
StA--------------- State	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Fast intake, soil blowing.	Soil blowing---	Favorable.
StB--------------- State	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Fast intake, soil blowing, slope.	Soil blowing---	Favorable.
SuA: State-------------	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Fast intake, soil blowing.	Soil blowing---	Favorable.
Urban land.						

TABLE 18.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Tm: Tomahawk	Severe: piping, wetness, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness	Droughty.
To: Tomotley	Severe: piping, wetness.	Severe: slow refill.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
UD. Udorthents						
Ur. Urban land						
VaB: Valhalla	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, rooting depth.	Too sandy	Droughty, rooting depth.
WaA: Wahee	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
WnB: Wando	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
YeA: Yeopim	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
YeB: Yeopim	Severe: piping, wetness.	Severe: cutbanks cave.	Slope	Wetness, erodes easily, slope.	Erodes easily, wetness.	Erodes easily.

TABLE 19.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AaA: Altavista	0-10	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	10-50	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	50-72	Variable	---	---	0	---	---	---	---	---	---
Ap: Arapahoe	0-14	Fine sandy loam	SM	A-2, A-4	0	100	100	80-95	20-49	<30	NP-4
	14-25	Fine sandy loam, loam, sandy loam.	SM	A-2, A-4	0	100	100	70-100	20-49	---	NP
	25-60	Stratified loamy sand to sand.	SM, SP-SM	A-2, A-3, A-4	0	100	100	65-100	5-45	<30	NP-4
At: Augusta	0-12	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
	12-56	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	56-64	Coarse sandy loam, loam, gravelly loamy sand.	SM, SP-SM, ML, SM-SC	A-2, A-4, A-1	0	75-100	55-100	30-99	10-70	<25	NP-5
Au:											
Augusta	0-12	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
	12-56	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	56-64	Coarse sandy loam, loam, gravelly loamy sand.	SM, SP-SM, ML, SM-SC	A-2, A-4, A-1	0	75-100	55-100	30-99	10-70	<25	NP-5
Urban land.											
BoA: Bojac	0-13	Loamy fine sand	SM	A-2	0	95-100	95-100	50-100	15-30	<20	NP
	13-35	Fine sandy loam, loam, sandy loam.	ML, SM	A-2, A-4	0	95-100	95-100	55-100	20-60	<35	NP-10
	35-72	Stratified loamy fine sand to coarse sand.	SM, SP, SW-SM	A-1, A-2, A-3	0	80-100	75-100	12-100	2-35	<20	NP
CaB: Cainhoy	0-80	Fine sand	SP-SM, SM	A-3, A-2	0	100	100	80-100	5-18	---	NP
	80-99	Fine sand, sand	SP-SM, SP	A-3	0	100	100	80-100	3-10	---	NP
Cf: Cape Fear	0-17	Loam	ML, CL-ML, CL	A-4, A-6	0	100	95-100	85-100	60-90	20-40	3-15
	17-52	Clay loam, clay, silty clay.	ML, CL, MH, CH	A-7	0	100	95-100	90-100	60-85	41-65	15-35
	52-62	Variable	---	---	---	---	---	---	---	---	---

TABLE 19.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ch---------------- Chapanoke	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	60-90	<30	NP-7
	6-50	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	85-100	60-95	22-49	8-30
	50-62	Fine sandy loam, loamy fine sand.	SM, SM-SC, ML	A-2, A-4	0	100	100	50-85	15-55	<30	NP-7
	62-80	Stratified sand to loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	98-100	98-100	50-95	18-80	<20	NP-7
CO---------------- Chowan	0-6	Silt loam--------	CL-ML, ML, MH	A-7-5, A-4, A-6	0	100	100	90-100	85-95	22-60	4-24
	6-27	Loam, silt loam, silty clay loam.	CL, MH, ML	A-7-5, A-4, A-6	0	100	100	90-100	85-96	22-62	6-30
	27-80	Sapric material	PT	---	---	---	---	---	---	---	NP
CtB--------------- Conetoe	0-25	Loamy sand-------	SM, SP-SM	A-2, A-3	0	100	100	50-95	5-30	---	NP
	25-46	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	50-95	20-40	<30	NP-10
	46-82	Loamy sand, sand	SM, SP, SP-SM	A-2, A-3, A-1	0	100	100	40-95	4-30	---	NP
DgA, DgB---------- Dogue	0-8	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-100	20-50	<25	NP-12
	8-66	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	66-72	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	<30	NP-12
DO---------------- Dorovan	0-3	Muck-------------	PT	---	0	---	---	---	---	---	---
	3-96	Muck-------------	PT	---	0	---	---	---	---	---	---
Ds---------------- Dragston	0-10	Loamy fine sand	SM, SM-SC	A-2	0	100	95-100	50-90	15-35	<18	NP-7
	10-36	Fine sandy loam, sandy loam, loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	60-85	30-60	<25	NP-10
	36-68	Sand, loamy sand, fine sandy loam.	SM, SP-SM, SM-SC	A-1, A-2, A-3	0	95-100	85-100	35-70	5-30	<18	NP-7
Ec---------------- Echaw	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	50-80	4-10	---	NP
	8-36	Loamy sand, fine sand, sand.	SM	A-2, A-3	0	100	100	50-75	5-30	---	NP
	36-64	Fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-70	5-20	---	NP
Ic---------------- Icaria	0-11	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	98-100	98-100	65-95	30-65	<30	NP-7
	11-25	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6	0	98-100	98-100	75-95	36-75	18-40	7-18
	25-29	Loamy sand, sand, loamy fine sand.	SM	A-2	0	100	100	50-85	15-30	---	NP
	29-62	Sand, fine sand	SM, SP-SM	A-2	0	100	100	50-75	10-30	---	NP
Ly---------------- Lynn Haven	0-16	Sand-------------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	80-100	2-14	---	NP
	16-64	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2-4	0	100	100	70-100	5-20	---	NP

TABLE 19.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
MuA---------------- Munden	0-14	Loamy fine sand	SM, SM-SC	A-2, A-4	0	100	98-100	55-85	15-45	<18	NP-7
	14-36	Sandy loam, loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	98-100	60-95	30-75	<30	NP-15
	36-62	Loamy sand, fine sand, sand.	SM, SP-SM, SM-SC	A-2, A-3	0	100	98-100	50-90	5-35	<18	NP-7
Nm---------------- Nimmo	0-6	Loamy fine sand	SM, SM-SC	A-2, A-4	0	100	95-100	55-85	15-45	<18	NP-7
	6-25	Loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-75	<30	NP-15
	25-60	Loamy sand, fine sand, sand.	SM, SP-SM, SM-SC	A-2, A-3	0	100	95-100	50-80	5-35	<18	NP-7
Pe---------------- Perquimans	0-8	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	55-80	<30	NP-7
	8-50	Loam, silty clay loam, clay loam.	CL	A-4, A-6, A-7	0	100	100	90-100	75-90	22-49	8-30
	50-62	Silt loam, loam, sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	55-80	<30	NP-7
Pt---------------- Portsmouth	0-16	Loam-------------	SM, SM-SC, ML	A-2, A-4	0	98-100	98-100	65-95	30-65	<30	NP-7
	16-36	Loam, sandy clay loam, clay loam.	SC, CL-ML, CL	A-4, A-6	0	98-100	98-100	75-95	36-70	18-40	7-18
	36-60	Loamy sand, sandy loam.	SM	A-2	0	98-100	98-100	50-70	13-35	<18	NP-4
Ro---------------- Roanoke	0-8	Silt loam--------	SM-SC, CL-ML, CL, SC	A-4, A-6	0	95-100	85-100	60-100	35-90	20-35	5-16
	8-43	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	43-72	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
Sc---------------- Scuppernong	0-36	Muck-------------	PT	---	---	---	---	---	---	---	---
	36-42	Mucky loam, mucky fine sandy loam.	ML, CL-ML SM, SN-ST	A-4	0	100	100	90-98	36-75	<30	NP-7
	42-72	Sand, loam, clay loam	SP-SM, SM CL, SC	A-2, A-3, A-4, A-6	0	100	100	51-90	5-70	<35	NP-14
Se---------------- Seabrook	0-10	Fine sand--------	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-99	5-25	---	NP
	10-80	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-100	5-25	---	NP
StA, StB--------- State	0-13	Loamy fine sand	SM, SM-SC	A-2, A-1	0	95-100	95-100	45-80	15-30	<18	NP-6
	13-42	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	42-60	Stratified sand to fine sandy loam.	SM, SM-SC, SP-SM	A-1, A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7

TABLE 19.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SuA:											
State-----------	0-13	Loamy fine sand	SM, SM-SC	A-2, A-1	0	95-100	95-100	45-75	15-30	<18	NP-6
	13-42	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	42-60	Stratified sand to fine sandy loam.	SM, SM-SC, SP-SM	A-1, A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7
Urban land.											
Tm--------------- Tomahawk	0-21	Loamy fine sand	SM, SP-SM	A-2-4, A-1-B	0	100	95-100	40-70	10-30	---	NP
	21-30	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2-4, A-4	0	100	95-100	50-80	20-49	<25	NP-10
	30-62	Fine sand, sand, loamy sand.	SM, SP-SM	A-2-4, A-1-B, A-3	0	100	95-100	35-65	5-20	---	NP
To--------------- Tomotley	0-7	Fine sandy loam	SM	A-2, A-4	0	98-100	95-100	75-98	25-50	<30	NP-7
	7-42	Fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	75-98	30-70	20-40	6-18
	42-72	Variable---------	---	---	---	---	---	---	---	---	---
UD. Udorthents											
Ur. Urban land											
VaB-------------- Valhalla	0-21	Fine sand--------	SM, SP-SM, SP	A-2, A-3	0	100	95-100	35-65	2-20	---	NP
	21-30	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-80	20-40	<30	NP-10
	30-99	Fine sand, sand	SM, SP-SM	A-2, A-3	0	100	95-100	35-65	2-20	---	NP
WaA-------------- Wahee	0-6	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	50-98	30-50	<28	NP-7
	6-40	Clay, clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	85-100	51-90	38-70	18-42
	40-65	Variable---------	---	---	---	---	---	---	---	---	---
WnB-------------- Wando	0-10	Fine sand--------	SP-SM, SM	A-2, A-3	0	96-100	95-100	60-98	5-25	---	NP
	10-82	Sand, fine sand	SP, SP-SM, SM	A-2, A-3	0	98-100	98-100	51-98	2-20	---	NP
YeA, YeB--------- Yeopim	0-8	Loam-------------	ML, CL-ML	A-4	0	100	100	85-100	55-80	<30	NP-7
	8-42	Silty clay loam, clay loam, loam.	CL	A-4, A-6, A-7	0	100	100	90-100	70-90	22-49	8-30
	42-62	Stratified sand to loam.	SM, ML, SM-SC, SP-SM	A-2, A-3, A-4	0	98-100	98-100	50-95	5-80	<20	NP-7

TABLE 20.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
AaA--------------	0-10	2.0-6.0	0.12-0.20	4.5-6.0	Low------------	0.24	5	.5-3
Altavista	10-50	0.6-2.0	0.12-0.20	4.5-6.0	Low------------	0.24		
	50-72	---	---	---	---------------	----		
Ap---------------	0-14	2.0-6.0	0.11-0.15	3.6-5.5	Low------------	0.15	5	5-20
Arapahoe	14-25	2.0-6.0	0.10-0.14	3.6-7.8	Low------------	0.15		
	25-60	2.0-20	0.05-0.14	5.1-7.8	Low------------	0.10		
At---------------	0-12	2.0-6.0	0.10-0.15	4.5-6.0	Low------------	0.20	4	.5-2
Augusta	12-56	0.6-2.0	0.12-0.18	4.5-6.0	Low------------	0.24		
	56-64	2.0-6.0	0.06-0.12	4.5-6.0	Low------------	0.24		
Au:								
Augusta---------	0-12	2.0-6.0	0.10-0.15	4.5-6.0	Low------------	0.20	4	.5-2
	12-56	0.6-2.0	0.12-0.18	4.5-6.0	Low------------	0.24		
	56-64	2.0-6.0	0.06-0.12	4.5-6.0	Low------------	0.24		
Urban land.								
BoA--------------	0-13	6.0-20	0.05-0.08	3.6-6.5	Low------------	0.28	3	.5-1
Bojac	13-35	2.0-6.0	0.10-0.17	3.6-6.5	Low------------	0.28		
	35-72	>6.0	0.02-0.05	4.5-6.0	Low------------	0.28		
CaB--------------	0-80	6.0-20	0.05-0.08	4.5-6.5	Low------------	0.10	5	<1
Cainhoy	80-99	6.0-20	0.05-0.08	4.5-6.5	Low------------	0.10		
Cf---------------	0-17	0.6-6.0	0.15-0.22	4.5-6.5	Low------------	0.15	5	5-15
Cape Fear	17-52	0.06-0.2	0.12-0.22	4.5-6.0	Moderate-------	0.32		
	52-62	---	---	---	---------------	----		
Ch---------------	0-6	2.0-6.0	0.15-0.24	3.6-6.5	Low------------	0.43	5	.5-2
Chapanoke	6-50	0.2-0.6	0.15-0.22	3.6-6.5	Low------------	0.43		
	50-62	0.2-0.6	0.15-0.24	3.6-6.5	Low------------	0.37		
	62-80	0.2-2.0	0.07-0.15	3.6-6.5	Low------------	0.20		
CO---------------	0-6	2.0-6.0	0.15-0.20	3.6-6.0	Low------------	0.32	4	2-4
Chowan	6-27	0.2-0.6	0.15-0.20	3.6-6.0	Low------------	0.32		
	27-80	0.2-6.0	0.20-0.26	3.6-5.0	Low------------	----		
CtB--------------	0-25	6.0-20	0.05-0.10	4.5-6.0	Low------------	0.15	5	.5-2
Conetoe	25-46	2.0-6.0	0.10-0.15	4.5-6.0	Low------------	0.15		
	46-82	6.0-20	0.05-0.10	4.5-6.0	Low------------	0.10		
DgA, DgB---------	0-8	2.0-6.0	0.08-0.15	3.6-5.5	Low------------	0.28	4	.5-1
Dogue	8-66	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-------	0.28		
	66-72	0.6-6.0	0.05-0.14	3.6-5.5	Low------------	0.17		
DO---------------	0-3	0.6-2.0	0.25-0.50	3.6-4.4	---------------	----	---	---
Dorovan	3-96	0.6-2.0	0.25-0.50	3.6-4.4	---------------	----		
Ds---------------	0-10	>6.0	0.06-0.11	4.5-5.5	Low------------	0.17	4	.5-1
Dragston	10-36	2.0-6.0	0.08-0.16	4.5-5.5	Low------------	0.17		
	36-68	>6.0	0.04-0.10	4.5-6.5	Low------------	0.17		

TABLE 20.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	In/hr	In/in	pH				Pct
Ec---------------- Echaw	0-8	2.0-20	0.03-0.08	4.5-6.0	Low-------------	0.10	5	<1
	8-36	6.0-20	0.05-0.10	4.5-6.0	Low-------------	0.10		
	36-64	2.0-20	0.03-0.08	4.5-6.0	Low-------------	0.10		
Ic---------------- Icaria	0-11	0.6-6.0	0.12-0.18	3.6-5.5	Low-------------	0.17	5	3-15
	11-25	0.6-2.0	0.14-0.20	3.6-5.5	Low-------------	0.28		
	25-29	2.0-6.0	0.06-0.10	3.6-5.5	Low-------------	0.17		
	29-62	2.0-6.0	0.02-0.05	3.6-5.5	Low-------------	0.17		
Ly---------------- Lynn Haven	0-16	6.0-20	0.05-0.10	3.6-5.5	Low-------------	0.10	5	1-4
	16-64	0.6-6.0	0.10-0.20	3.6-5.5	Low-------------	0.15		
MuA--------------- Munden	0-14	2.0-6.0	0.06-0.10	4.5-6.0	Low-------------	0.20	4	.5-1
	14-36	0.6-6.0	0.08-0.17	4.5-6.0	Low-------------	0.17		
	36-62	>2.0	0.04-0.08	4.5-6.0	Low-------------	0.17		
Nm---------------- Nimmo	0-6	2.0-6.0	0.06-0.10	3.6-5.5	Low-------------	0.17	4	1-2
	6-25	0.6-2.0	0.08-0.17	3.6-5.5	Low-------------	0.17		
	25-60	>2.0	0.04-0.08	3.6-5.5	Low-------------	0.17		
Pe---------------- Perquimans	0-8	2.0-6.0	0.13-0.20	4.5-6.5	Low-------------	0.37	4	2-4
	8-50	0.2-0.6	0.15-0.20	4.5-6.0	Low-------------	0.43		
	50-62	0.2-0.6	0.13-0.20	4.5-6.0	Low-------------	0.37		
Pt---------------- Portsmouth	0-16	0.6-6.0	0.12-0.18	3.6-5.5	Low-------------	0.24	5	3-15
	16-36	0.6-2.0	0.14-0.20	3.6-5.5	Low-------------	0.28		
	36-60	2.0-6.0	0.06-0.10	3.6-5.5	Low-------------	0.17		
	38-72	6.0-20	0.02-0.05	3.6-6.0	Low-------------	0.17		
Ro---------------- Roanoke	0-8	0.6-2.0	0.14-0.20	3.6-5.5	Low-------------	0.37	4	.5-2
	8-43	0.06-0.2	0.16-0.19	3.6-5.5	Moderate--------	0.24		
	43-72	0.06-0.2	0.10-0.19	3.6-5.5	Moderate--------	0.24		
Sc---------------- Scuppernong	0-36	0.2-6.0	0.35-0.45	<4.5	Low-------------	----	---	30-70
	36-42	0.2-6.0	0.18-0.28	3.6-7.3	Low-------------	0.32		
	42-72	6.0-20	0.02-0.05	3.6-7.3	Low-------------	0.15		
Se---------------- Seabrook	0-10	6.0-20	0.05-0.11	4.5-6.5	Low-------------	0.10	5	.5-2
	10-80	6.0-20	0.02-0.09	4.5-6.5	Low-------------	0.10		
StA, StB---------- State	0-13	2.0-6.0	0.06-0.09	4.5-5.5	Low-------------	0.28	5	<1
	13-42	0.6-2.0	0.14-0.19	4.5-5.5	Low-------------	0.28		
	42-60	>2.0	0.02-0.10	4.5-6.0	Low-------------	0.17		
SuA: State------------	0-13	2.0-6.0	0.06-0.09	4.5-5.5	Low-------------	0.28	5	<1
	13-42	0.6-2.0	0.14-0.19	4.5-5.5	Low-------------	0.28		
	42-60	>2.0	0.02-0.10	4.5-6.0	Low-------------	0.17		
Urban land.								
Tm---------------- Tomahawk	0-21	6.0-20	0.04-0.10	4.5-5.5	Low-------------	0.10	5	.5-2
	21-30	2.0-6.0	0.10-0.14	4.5-5.5	Low-------------	0.15		
	30-62	0.6-2.0	0.04-0.08	4.5-6.5	Low-------------	0.10		
To---------------- Tomotley	0-7	2.0-6.0	0.10-0.15	3.6-5.5	Low-------------	0.20	5	1-6
	7-42	0.6-2.0	0.12-0.18	3.6-5.5	Low-------------	0.20		
	42-72	0.2-0.6	---	---	----------------	----		
UD. Udorthents								

TABLE 20.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
Ur. Urban land								
VaB--------------- Valhalla	0-21	2.0-6.0	0.06-0.10	4.5-6.0	Low------------	0.15	5	.5-1
	21-30	2.0-6.0	0.10-0.15	4.5-6.0	Low------------	0.24		
	30-99	6.0-20	0.02-0.05	4.5-6.0	Low------------	0.15		
WaA--------------- Wahee	0-6	0.6-2.0	0.10-0.15	4.5-6.0	Low------------	0.24	5	.5-5
	6-40	0.06-0.2	0.12-0.20	3.6-5.5	Moderate-------	0.28		
	40-65	0.2-0.6	0.12-0.20	3.6-5.5	Moderate-------	0.28		
WnB--------------- Wando	0-10	6.0-20	0.05-0.08	5.6-7.3	Low------------	0.10	5	<1
	10-82	6.0-20	0.03-0.07	5.6-7.3	Low------------	0.10		
YeA, YeB--------- Yeopim	0-8	2.0-6.0	0.15-0.20	3.6-5.5	Low------------	0.37	4	.5-2
	8-42	0.6-2.0	0.15-0.20	3.6-5.5	Low------------	0.37		
	42-62	0.6-6.0	0.15-0.20	3.6-5.5	Low------------	0.17		

TABLE 21.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
AaA: Altavista	C	None	---	---	1.5-2.5	Apparent	Dec-Mar	Moderate	Moderate.
Ap: Arapahoe	B/D	Rare	---	---	0-1.0	Apparent	Dec-May	High	High.
At: Augusta	C	None	---	---	1.0-2.0	Apparent	Jan-May	High	Moderate.
Au:									
Augusta	C	None	---	---	1.0-2.0	Apparent	Jan-May	High	Moderate.
Urban land.									
BoA: Bojac	B	None	---	---	4.0-6.0	Apparent	Nov-Apr	Low	High.
CaB: Cainhoy	A	None	---	---	>6.0	---	---	Low	Moderate.
Cf: Cape Fear	D	Rare	---	---	0-1.5	Apparent	Dec-Apr	High	High.
Ch: Chapanoke	C	None	---	---	0.5-1.5	Apparent	Nov-Apr	High	High.
CO: Chowan	D	Frequent	Very long	Nov-Apr	0-0.5	Apparent	Nov-Apr	High	High.
CtB: Conetoe	A	None	---	---	>6.0	---	---	Low	High.
DgA, DgB: Dogue	C	None	---	---	1.5-3.0	Apparent	Jan-Mar	High	High.
DO*: Dorovan	D	Frequent	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	High	High.
Ds: Dragston	C	None	---	---	1.0-2.5	Apparent	Nov-Apr	Low	High.
Ec: Echaw	B	None	---	---	2.5-5.0	Apparent	Nov-Apr	Low	High.
Ic: Icaria	D	None	---	---	0-1.0	Apparent	Nov-Apr	High	High.
Ly: Lynn Haven	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	High	High.
MuA: Munden	B	None	---	---	1.5-2.5	Apparent	Dec-Apr	Low	High.
Nm: Nimmo	D	None	---	---	0-1.0	Apparent	Dec-Apr	Low	High.

See footnote at end of table.

TABLE 21.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Pe----------------- Perquimans	D	None---------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Pt----------------- Portsmouth	B/D	Rare---------	---	---	0-1.0	Apparent	Dec-Apr	High-----	High.
Ro----------------- Roanoke	D	Rare---------	---	---	0-1.0	Apparent	Nov-May	High-----	High.
Sc----------------- Scuppernong	D	Rare---------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Se----------------- Seabrook	C	None---------	---	---	2.0-4.0	Apparent	Dec-Mar	Low------	Moderate.
StA, StB---------- State	B	None---------	---	---	4.0-6.0	Apparent	Dec-Jun	Moderate	High.
SuA:									
State------------	B	None---------	---	---	4.0-6.0	Apparent	Dec-Jun	Moderate	High.
Urban land.									
Tm----------------- Tomahawk	A	None---------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	High.
To----------------- Tomotley	B/D	Rare---------	---	---	0-1.0	Apparent	Dec-Mar	High-----	High.
UD. Udorthents									
Ur. Urban land									
VaB---------------- Valhalla	A	None---------	---	---	>4.0	Apparent	Nov-Mar	Low------	Moderate.
WaA---------------- Wahee	D	None---------	---	---	0.5-1.5	Apparent	Dec-Mar	High-----	High.
WnB---------------- Wando	A	None---------	---	---	>6.0	---	---	Low------	Moderate.
YeA, YeB---------- Yeopim	B	None---------	---	---	1.5-3.0	Apparent	Nov-Mar	Moderate	High.

* In the "High Water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 22.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic. All of the soils in this table are the typical pedon for the soil series]

Soil name, sample number, horizon, and depth in inches	Classification		Grain-size distribution							Liquid limit	Plasticity index	Moisture density	
	AASHTO	Unified	Percentage passing sieve-- No. 4	No. 10	No. 40	No. 200	Percentage smaller than-- .02 mm	.005 mm	.002 mm			Maximum dry density	Optimum Moisture
										Pct		Lb/CuFt	Pct
Arapahoe fine sandy loam (S79NC-143-1)													
Ap -- 0-10	A-4(0)	SM	100	100	95	37	18	4	2	---	NP	69.0	38.0
Bg -- 14-25	A-2-4(0)	SM	100	100	100	31	29	8	6	---	NP	114.6	11.9
Chowan silt loam: (S79NC-041-2)													
A1 -- 0- 6	A-7-5(18)	MH	100	100	97	94	78	37	17	---	---	69.8	40.1
Cg1-- 6-20	A-7-5(19)	MH	100	100	97	95	87	59	34	62	28	---	---
Dogue fine sandy loam (S79NC-041-3)													
Ap -- 0- 8	A-4(2)	SM	100	99	88	43	18	10	6	---	NP	121.8	9.6
Bt2-- 19-26	A-7-6(20)	CH	100	99	94	75	59	49	42	58	37	102.3	21.6
C -- 66-72	A-2-6(0)	SC	100	99	72	26	22	19	16	27	12	120.5	12.2
State loamy fine sand (S79NC-041-4)													
Ap -- 0- 7	A-2-4(0)	SM	100	100	80	18	7	3	1	---	NP	115.0	9.6
Bt1-- 13-38	A-6(4)	CL	100	100	84	43	34	28	26	34	17	115.0	14.5
C -- 42-60	A-3(0)	SM	100	100	71	9	6	5	4	---	NP	111.4	11.9
Yeopim loam: (S79NC-041-5)													
Ap -- 0- 8	A-4(7)	ML	100	100	99	72	31	13	8	20	2	114.9	12.1
Bt1-- 8-23	A-6(12)	CL	100	100	100	87	56	39	32	40	21	107.3	18.0
2C2-- 55-62	A-2-4(0)	SM	100	100	100	18	14	12	10	---	NP	112.0	12.8

TABLE 23.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Arapahoe	Coarse-loamy, mixed, nonacid, thermic Typic Humaquepts
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Bojac	Coarse-loamy, mixed, thermic Typic Hapludults
Cainhoy	Thermic, coated Typic Quartzipsamments
Cape Fear	Clayey, mixed, thermic Typic Umbraquults
Chapanoke	Fine-silty, mixed, thermic Aeric Ochraquult
Chowan	Fine-silty, mixed, nonacid, thermic Thapto-Histic Fluvaquents
Conetoe	Loamy, mixed, thermic Arenic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Dorovan	Dysic, thermic Typic Medisaprists
Dragston	Coarse-loamy, mixed, thermic Aeric Ochraquults
Echaw	Sandy, siliceous, thermic Entic Haplohumods
Icaria	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Umbraquults
Lynn Haven	Sandy, siliceous, thermic Typic Haplaquods
Munden	Coarse-loamy, mixed, thermic Aquic Hapludults
Nimmo	Coarse-loamy, mixed, thermic Typic Ochraquults
Perquimans	Fine-silty, mixed, thermic Typic Ochraquults
Portsmouth	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Scuppernong	Loamy, mixed, dysic, thermic Terric Medisaprists
Seabrook	Mixed, thermic Aquic Udipsamments
State	Fine-loamy, mixed, thermic Typic Hapludults
Tomahawk	Loamy, siliceous, thermic Arenic Hapludults
Tomotley	Fine-loamy, mixed, thermic Typic Ochraquults
Udorthents	Loamy, mixed, thermic Typic Udorthents
Valhalla	Loamy, siliceous, thermic Arenic Hapludults
Wahee	Clayey, mixed, thermic Aeric Ochraquults
Wando	Siliceous, thermic Typic Udipsamments
Yeopim	Fine-silty, mixed, thermic Aquic Hapludults

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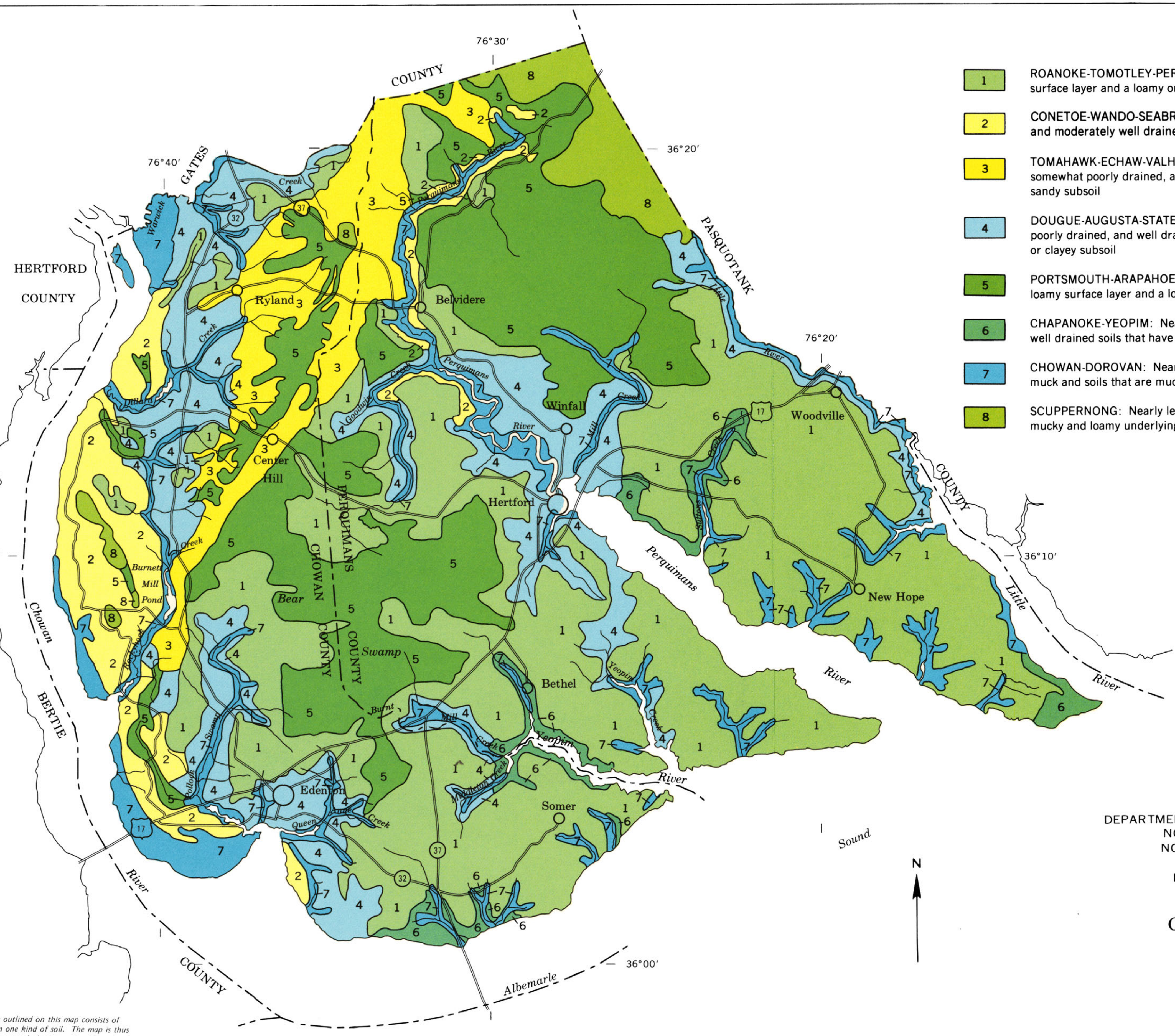


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

1	ROANOKE-TOMOTLEY-PERQUIMANS: Nearly level, poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil
2	CONETOE-WANDO-SEABROOK: Nearly level and gently sloping, well drained, excessively drained, and moderately well drained soils that have a sandy surface layer and a loamy or sandy subsoil
3	TOMAHAWK-ECHAW-VALHALLA: Nearly level and gently sloping, moderately well drained, somewhat poorly drained, and well drained soils that have a sandy surface layer and a loamy or sandy subsoil
4	DOUGUE-AUGUSTA-STATE: Nearly level and gently sloping,moderately well drained, somewhat poorly drained, and well drained soils that have a sandy or loamy surface layer and a loamy or clayey subsoil
5	PORTSMOUTH-ARAPAHOE-CAPE FEAR: Nearly level, very poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil
6	CHAPANOKE-YEOPIM: Nearly level and gently sloping, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy subsoil
7	CHOWAN-DOROVAN: Nearly level, very poorly drained soils that are loamy and are underlain by muck and soils that are muck throughout
8	SCUPPERNONG: Nearly level, very poorly drained soils that have a surface layer of muck and mucky and loamy underlying material

Compiled 1982

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NORTH CAROLINA
DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE
CHOWAN COUNTY BOARD OF COMMISSIONERS
PERQUIMANS COUNTY BOARD OF COMMISSIONERS

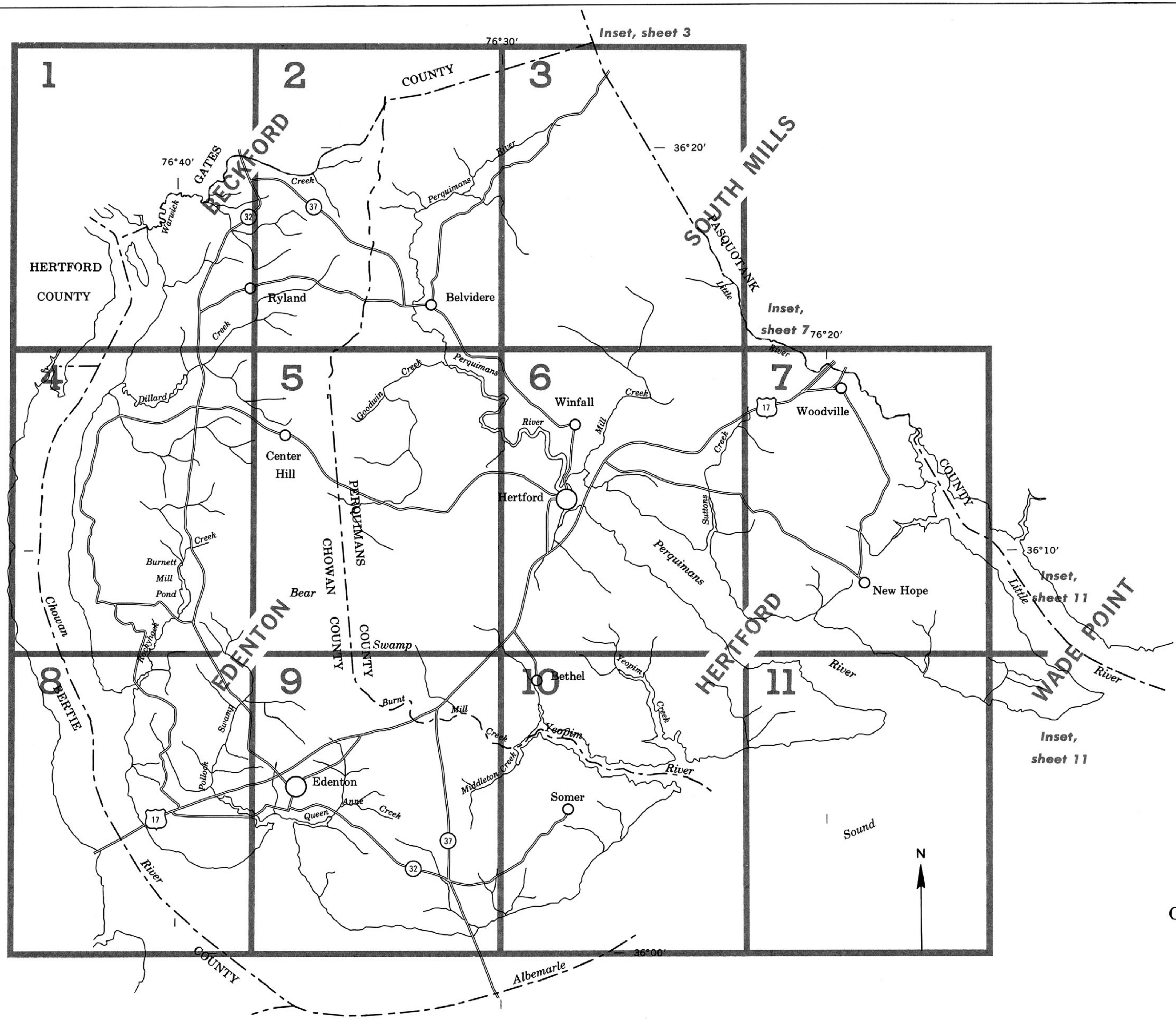
GENERAL SOIL MAP
CHOWAN AND PERQUIMANS COUNTIES
NORTH CAROLINA

N

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

CHOWAN AND PERQUIMANS COUNTIES
NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined 1/; otherwise, it is a small letter. The third letter, if used, is always a capital and shows the slope. Symbols without slope letters are those of nearly level soils or miscellaneous areas.

SYMBOL	NAME
AaA	Altavista fine sandy loam, 0 to 2 percent slopes
Ap	Arapahoe fine sandy loam
At	Augusta fine sandy loam
Au	Augusta-Urban land complex
BoA	Bojac loamy fine sand, 0 to 3 percent slopes
CaB	Cainhoy fine sand, 0 to 6 percent slopes
Cf	Cafe Fear loam
Ch	Chapanoke silt loam
CO	Chowan silt loam
CtB	Conetoe loamy sand, 0 to 5 percent slopes
DgA	Dogue fine sandy loam, 0 to 2 percent slopes
DgB	Dogue fine sandy loam, 2 to 6 percent slopes
DO	Dorovan muck
Ds	Dragston loamy fine sand
Ec	Echaw fine sand
Ic	Icaria fine sandy loam
Ly	Lynn Haven sand
MuA	Munden loamy fine sand, 0 to 2 percent slopes
Nm	Nimmo loamy fine sand
Pe	Perquimans silt loam
Pt	Portsmouth loam
Ro	Roanoke silt loam
Sc	Scuppernong muck
Se	Seabrook fine sand
StA	State loamy fine sand, 0 to 2 percent slopes
StB	State loamy fine sand, 2 to 6 percent slopes
SuA	State-Urban land complex, 0 to 2 percent slopes
Tm	Tomahawk loamy fine sand
To	Tomotley fine sandy loam
UD	Udorthents, loamy
Ur	Urban land
VaB	Valhalla fine sand, 0 to 6 percent slopes
WaA	Wahee fine sandy loam, 0 to 2 percent slopes
WnB	Wando fine sand, 0 to 5 percent slopes
YeA	Yeopim loam, 0 to 2 percent slopes
YeB	Yeopim loam, 2 to 6 percent slopes

1/ The composition of these units is more variable than that of others in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) — Hedley Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CnB WaC

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

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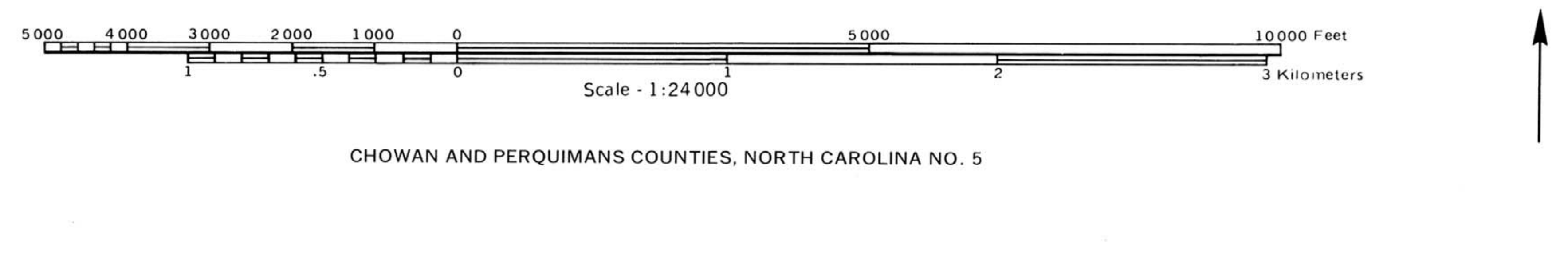

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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

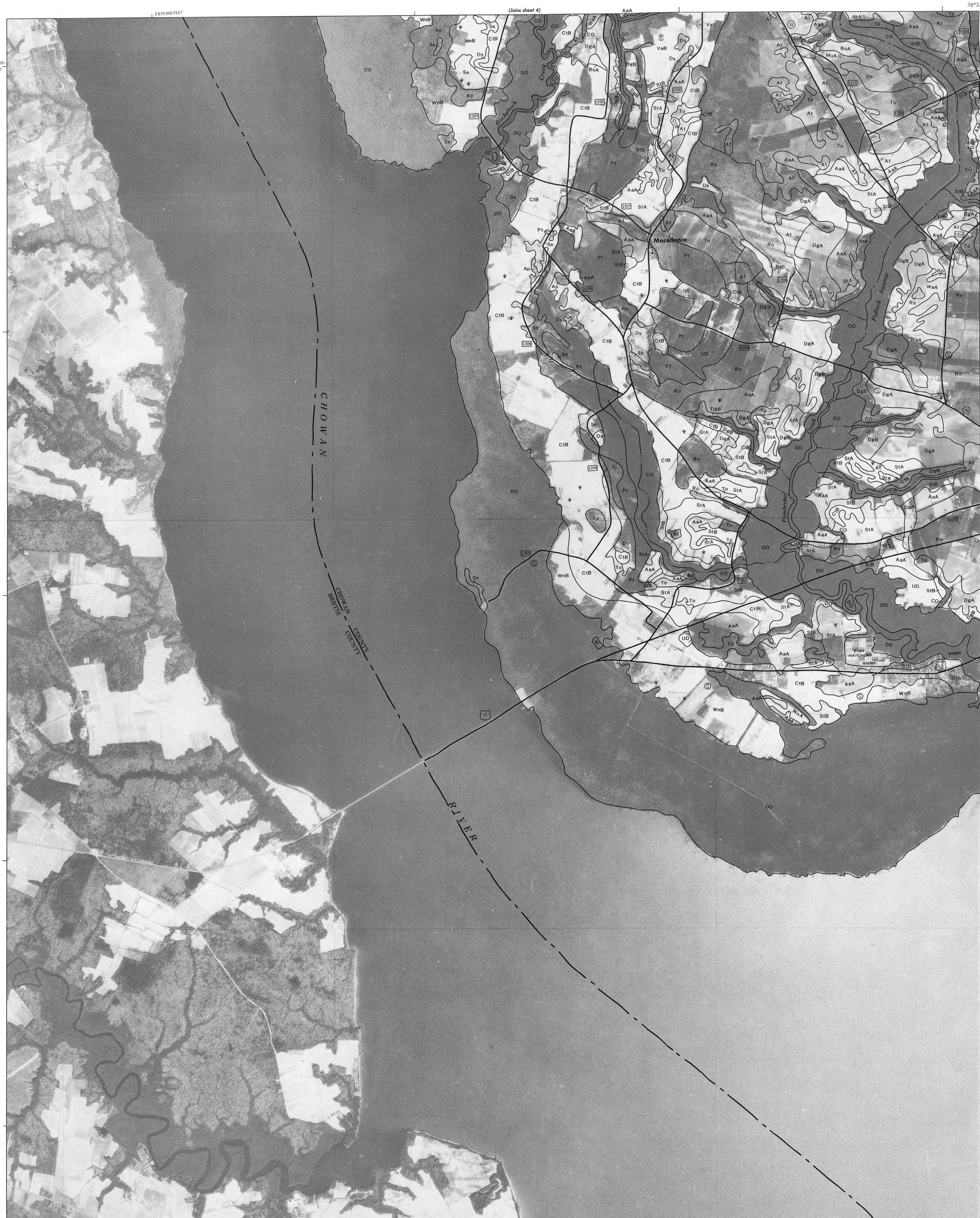
N

CHOWAN AND PERQUIMANS COUNTIES, NORTH CAROLINA NO. 6

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N



Scale - 1:24000

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

N

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5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

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Scale - 1:24 000

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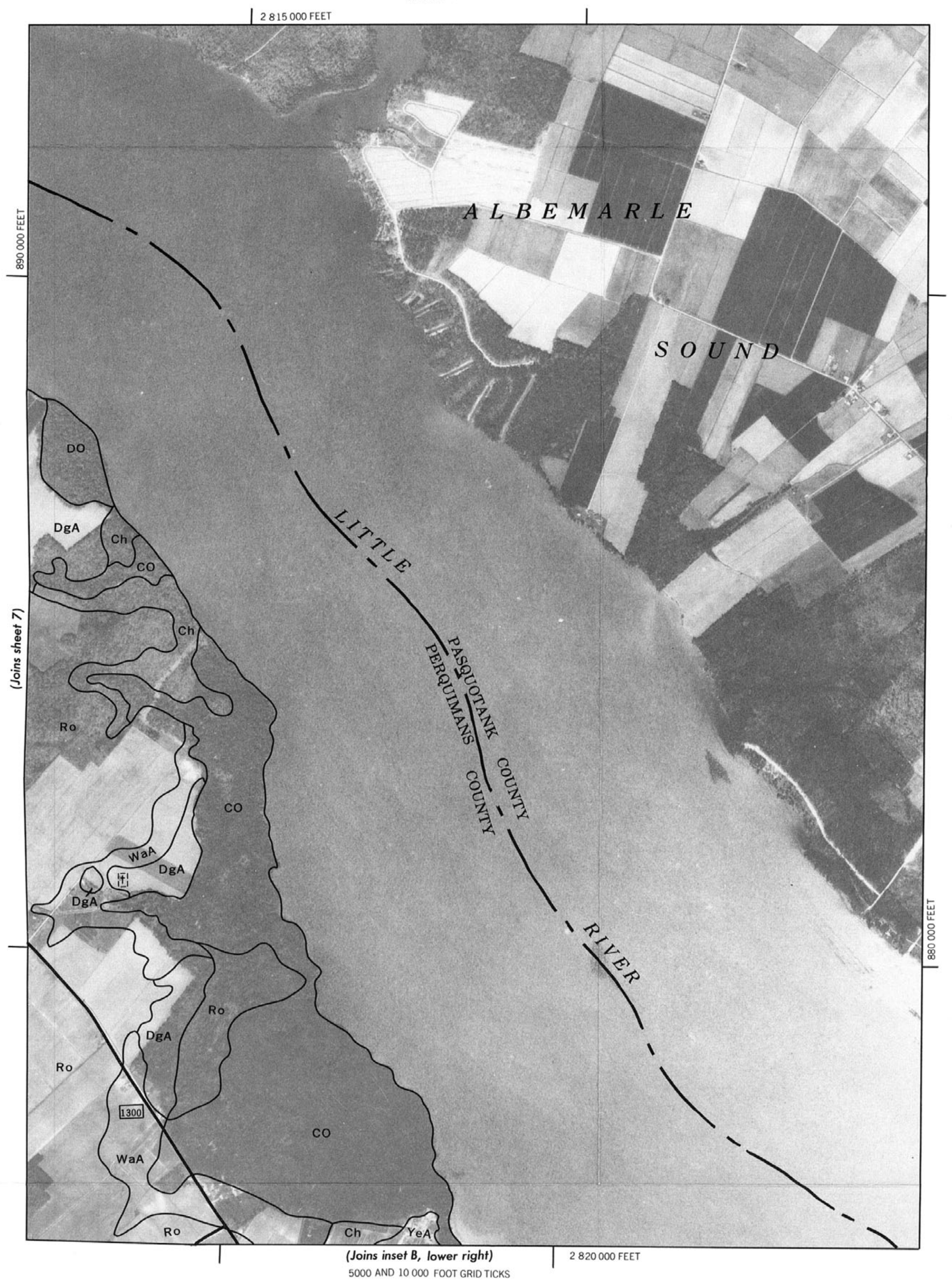
INSET A



INSET B

5000 4000 3000 2000 1000 0 5000 10 000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24 000

N

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